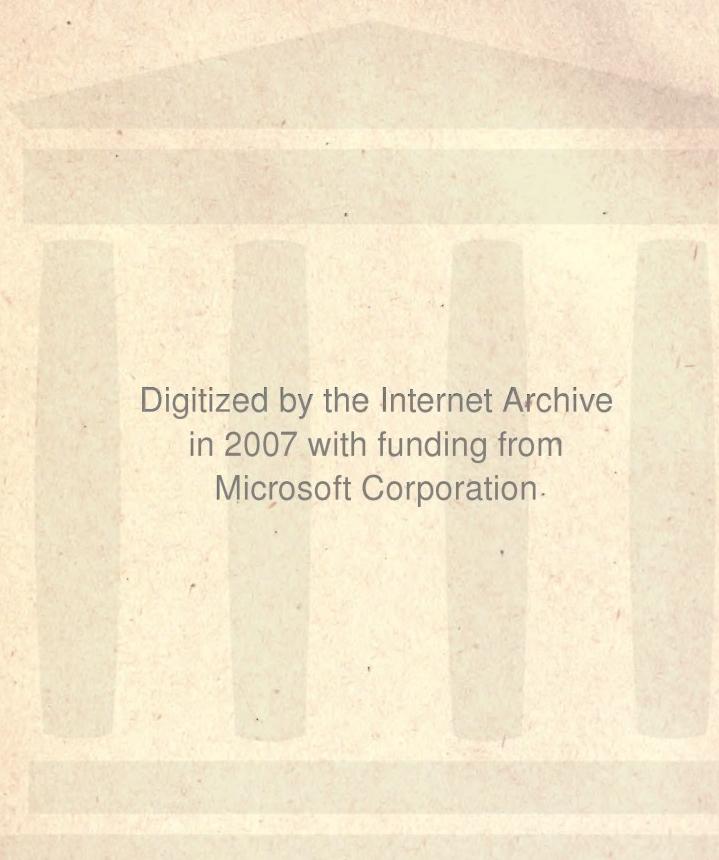


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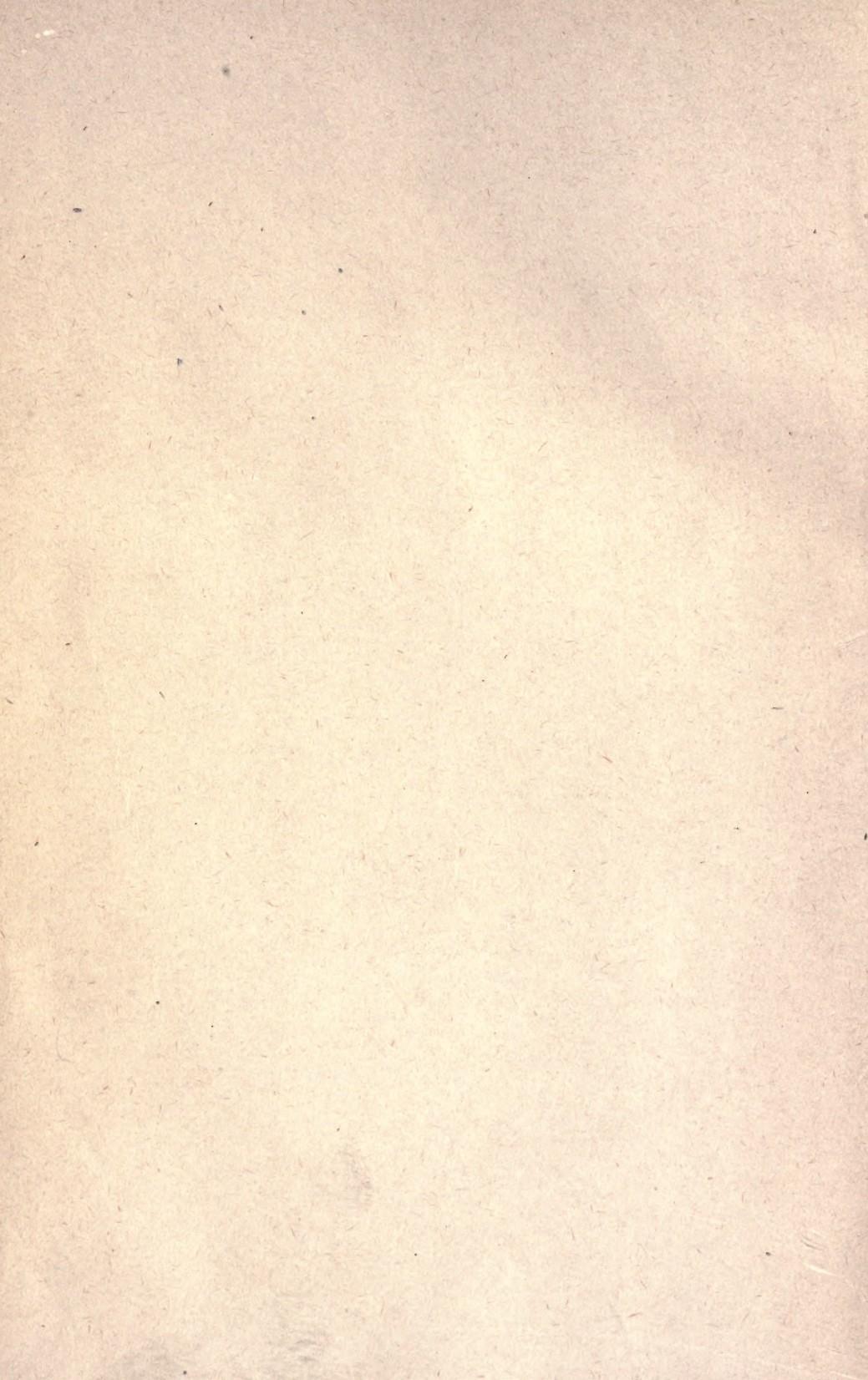


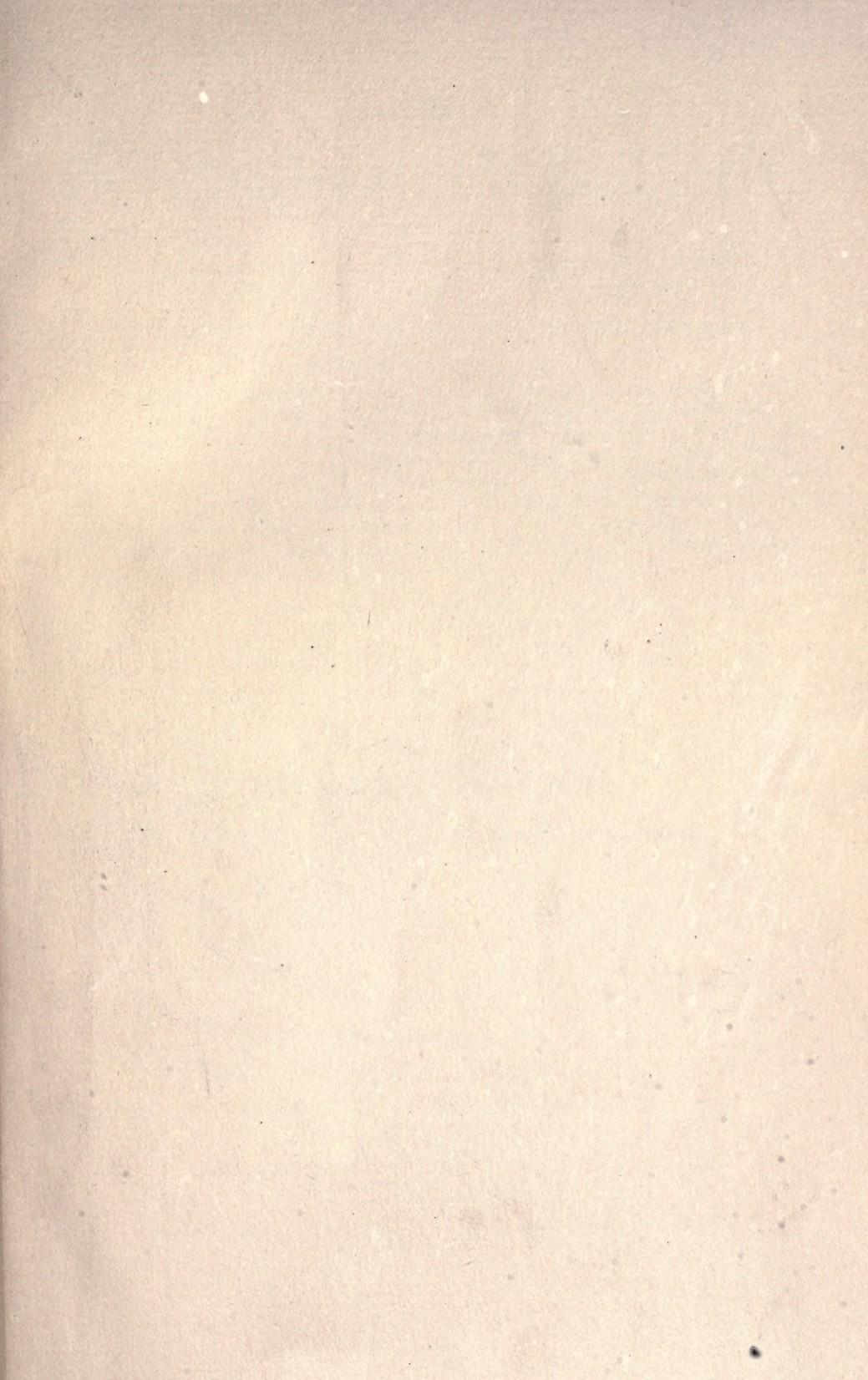


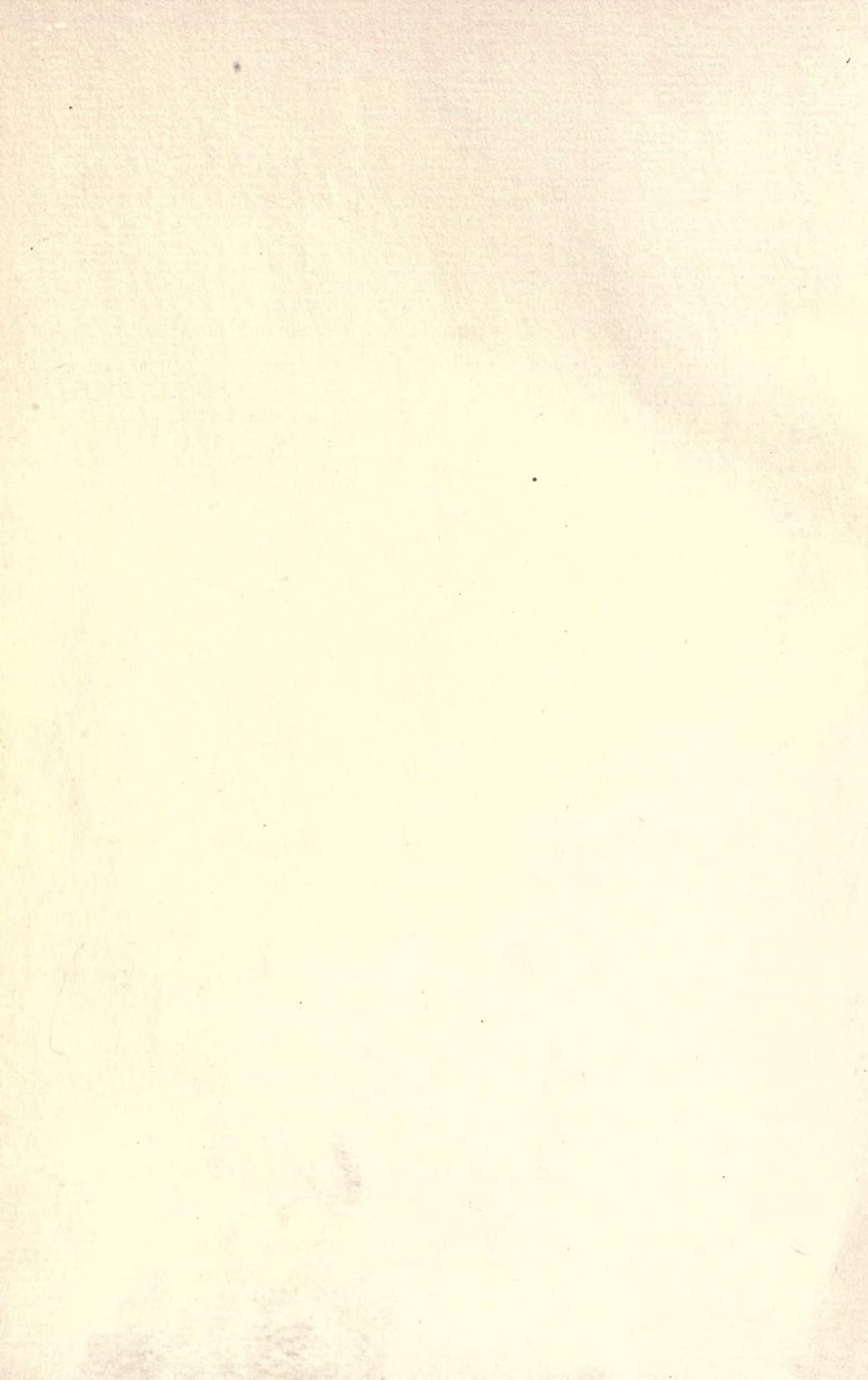


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THE  
**Psychological Bulletin**

J. MARK BALDWIN  
JOHNS HOPKINS UNIVERSITY

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January 15, 1908.

THE

# PSYCHOLOGICAL BULLETIN

## PSYCHOLOGICAL PROGRESS IN 1907.

BY PROFESSOR EDWARD FRANKLIN BUCHNER.

*University of Alabama.*

Judged within the close range of its dying hours, the year 1907 does not seem to be conspicuous in the annual achievements of psychology. Sketching its story is a task not unlike that ancient one of making bricks without straw. Activity there has been in research and discussion, and in bringing to completion important projects already known. But no new methods have come in to modify the technique. No new principles have been announced that would change the fundamental points of view of the science. It may even be chronicled that this psychological year has been marked by an absence of general tendencies which have been so noticeable in the onward movement among its predecessors. The angle of individual straws has shown the winds to have been blowing in all directions. This may in part be incidental to the marked falling off in the literary undertakings so characteristic of the science a decade or so ago when the great series of treatises were appearing in America, England, France and Germany.

That modern psychology is still an unsettled science is to be seen in the continued debate as to its real nature and the assumptions upon which its constructive activities are to be based. In his last work,<sup>1</sup> in which he sang his swan song, Möbius reveals, as he thinks, the utter hopelessness of psychology in its struggle to become a science. The only basis of science is the physical. The mental life, made up of thoughts and feelings, is different from nature. The difficulties confronting psychology as a 'physical' explanation of experience are to be removed by a recognition of the central importance of metaphysics and the need for positing the existence of souls in every physical and biological unit. In other words, psychology as a science must yield

*Die Hoffnungslosigkeit aller Psychologie, 1907.*

to panpsychism. As much as to say that psychology is not 'hopeless,' Miss Calkins raises the query: Psychology: 'What is It about?' In her partially published answer, the double demand is made that metaphysics shall be eliminated from psychology, and that the psychologist shall admit into his thinking the every-day distinction between the psychical and the physical. The advance of psychology is checked partly 'through the common failure to recognize explicitly the real subject-matter of the science and through the underestimate of adequate description' of consciousness. In reasserting that psychology is not a science of consciousness viewed as a biological function, but of 'the functioner,' provision is made for the place of 'the conscious self' as the subject-matter. Stumpf has newly declared that the science is dealing with both mental contents and with mental functions.<sup>2</sup> In a still more hopeful manner, Kirkpatrick would enrich the science's vocabulary while suggesting its need of a broader basis.<sup>3</sup> "Our ideas of a functional psychology must be developed and broadened to include unconscious functioning." He offers the new term 'organosis,' which, including the meanings of neurosis and psychosis, is 'to signify the adaptive functioning of any organism or organ without reference to whether the activity involved is conscious or unconscious, and without reference to whether the organ is nervous or non-nervous.' When the functioning is accompanied by consciousness then psychology may step in as being primarily concerned. The most systematic exposition, if not defense, of the rapidly spreading functional point of view that has yet been made appeared in Angell's presidential address.<sup>4</sup> One would almost be led to believe that the long observed structural point of view was an abstraction and produced erroneous results. The whole field is parcelled out to the three methods which deal with the psychology of mental operations, mind as mediating between the environment and the needs of the organism, and the significance of the mind-body relationship. Answers to the 'functional' questions of the 'how,' and the 'why' are held to be deeply implicated in the answers to the old 'structural' question of the 'what' of consciousness.

The continued analysis of consciousness to suit the working needs of theoretical and practical psychologists is evident in Pierce's affirma-

<sup>1</sup> *Journ. of Phil., Psych. and Sci. Methods*, December 5, 1907.

<sup>2</sup> 'Erscheinungen und psychische Functionen,' *Abhandl. d. kgl. preuss. Akad. d. Wiss.*, 1906.

<sup>3</sup> 'A Broader Basis for Psychology Necessary,' *Journ. of Phil., Psych. and Sci. Methods*, September 26, 1907.

<sup>4</sup> 'The Province of Functional Psychology' (before the American Psychological Association, December, 1906), *PSYCH. REV.*, March, 1907.

tive answer to his question,<sup>1</sup> and in Sidis' theory, suggested by certain clinical results.<sup>2</sup> Pierce regards the phrase 'unconscious cerebration,' much used in the days of Carpenter, as 'necessary' for some explanations. If it means, as he intends, 'cerebration significant for later consciousness, but unaccompanied by present consciousness,' it is supposed to explain such phenomena as mental incubation, suddenly appearing words, and unexpected solutions of problems. To meet, as supposed, the explanatory requirements of clinical psychiatry, Sidis distinguishes the 'hypnoidal' states of consciousness, which lie between the waking and the sleeping states. On this basis is advanced the theory of 'recurrent psychomotor states,' which, having become dissociated, are responsible for phobia, obsessions, etc., because of accumulated nerve energy insufficiently balanced.

Probably the most conspicuous single achievement in the period under review is the 'series of text-books designed to introduce the student to the methods and principles of scientific psychology' by Judd.<sup>3</sup> It combines the virtues of constructive psychological theory with the assured technique of experimentation. Produced in the laboratory and designed to contribute to the advance of laboratory instruction, it is probably the best available concrete index to the view that experimental psychology is never an end in itself, but at best is to be regarded only as a scientific and pedagogical means to the end of promoting final psychological theory. The leading principles underlying the 'General Introduction' are the functional view, the genetic method of treatment, emphasis upon the physiological conditions, and the significance of ideation as a unique and final stage of evolution, as stated by the author. In reminding the psychologist that it is his duty not to 'ignore the unique reality of consciousness,' in presenting a new five-fold analysis of consciousness to supersede the old three-fold and two-fold classifications of mental processes, and especially in reinstating the concept of self into the fundamental graces of the science, those principles have gone far in arighting many recent tangential tendencies into the direction of the permanent development of psychology.

Some progress has been made in throwing light upon the obscure region of the neural conditions of consciousness. The long-since rec-

<sup>1</sup>"Should we retain the expression 'Unconscious Cerebration' to designate certain processes connected with the mental life?" *Journ. of Phil., Psych. and Sci. Methods*, November 8, 1906.

<sup>2</sup>'Studies in Psychopathology,' *Boston Med. and Surg. Journ.*, 1907.

<sup>3</sup>*Psychology: General Introduction*, Vol. I., 1907; *Laboratory Manual of Psychology*, Vol. II., 1907; *Laboratory Equipment for Psychological Experiments*, Vol. III., 1907.

ognized need of more patient investigation and more conclusive thinking about the physiological factors in experience seems at last to be receiving some marked degree of satisfaction. That physiology has immediate significance for psychology has been shown anew by Sherrington, who also contends that 'the main interest of biology must ultimately turn around the cerebrum,' the portion which has acquired dominance over the rest of the nervous system.<sup>1</sup> Campbell has accomplished a much-needed work in presenting the chief histological features of the entire cortex 'millimeter by millimeter.'<sup>2</sup> Unwilling 'to accept the hypothesis of attention or inhibition as accounting for all the facts which have been gathered relative to the frontal areas, Franz has shown, by experiments on cats and monkeys which had learned certain habits and associations before the operations, that 'the frontal lobes are concerned in normal and daily associational processes and that through them we are enabled to form habits, and, in general, to learn.'<sup>3</sup> A most interesting, if not startling, discussion on the cerebral localization of speech has been precipitated by Marie in his 'revision of the aphasia question.'<sup>4</sup> For nearly half a century the cortical region of the left frontal inferior convolution has been associated with the function of speech. The cortical geography, based mainly on the disorders of speech, assumed special centers for audition, vision and motor images, and sensory and motor aphasia were accordingly analyzed and explained. Marie's denial of the existence of these centers and rejection of these analyses threatens to overturn these ancient functional landmarks. 'Intrinsic' aphasia he regards as due to a 'defect of comprehension and of intellectual elaboration,' dependent in some way upon lesions in the Wernicke zone. In ending his series of studies, McDougall concludes with the theory that the basal conditions of attention are cerebral. While questioning the adequacy of a physiological theory of attention—a mental state which calls for a convergence of energy from many, or all, parts of the brain—he allows the possibility of a 'psychical guidance of physical processes.'<sup>5</sup>

<sup>1</sup> *The Integrative Action of the Nervous System* (Silliman Memorial Lectures at Yale University, 1904), 1906.

<sup>2</sup> *Histological Studies of the Localization of Cerebral Functions*. Cambridge (Engl.).

<sup>3</sup> *On the Functions of the Cerebrum: the Frontal Lobes*, Archives of Psychology, No. 2, 1907.

<sup>4</sup> 'Revision de la Question de l'aphasia. La troisième circonvolution frontal gauche ne joue aucun rôle spécial dans la fonction du langage,' *Semaine Médicale*, May 23, 1906 (and later articles). See Meyer, *Psych. Bull.*, June, 1907; Dercum, *Journ. of Nerv. and Ment. Diseases*, November, 1907.

<sup>5</sup> 'Physiological Factors of the Attention Process,' *Mind*, 1906.

During the earlier years of the history of our laboratories, chief attention was given to experimental attacks upon the sensory half of human experience. This emphasis may in part have been due to the dominance of the analytical or structural point of view, as well as being the line of least resistance for first developments. With the coming of the genetic method and functionalism, there is, an at least coincidental, increased attention given to the experimental investigation of the motor half of conscious processes. Motor complexes are not only regarded as sensory resultants, but are being more and more looked upon as constitutive elements in the organization of consciousness. This naturally brings one nearer the 'practical' phases of daily experiences, and may result in removing the semi-popular objection to psychological experimentation that in view of the ingenuity and assiduity displayed the worth of the results thus far obtained has not been commensurate to the great labors. There has also been in recent years an unusual organization of experimental results in meeting academic as well as scientific demands, as is evidenced by the several laboratory manuals now available. Experimental psychology seems to be on the verge of taking the next most important step which shall lead into the highly desirable 'inter-laboratory coöperation.' The detailed program of the Institute established a year ago by the German Gesellschaft für experimentelle Psychologie, and the opening session of the 1906 meeting of the American Psychological Association, devoted to an effective discussion of 'Organized Coöperation in Standardizing Psychological Tests' are unmistakable evidences that the era of experimental individualism is rapidly passing. The wide range of inquiry that can be taken by a well organized laboratory may be instanced in the twenty-three investigations reported in the second volume of the *Harvard Psychological Studies* (1906).

There need be no marvel if, as in former years, vision both normal and abnormal continues in its dominant attractiveness to experimentalists. In his review of studies on eye-movements, Herbertz holds that a law controlling eye-movements cannot be found; but suggests that their significance in the psycho-physical processes of optical perception would offer a better view of the problem.<sup>1</sup> The studies by Judd<sup>2</sup> and by Carr<sup>3</sup> may lead to a modification of the hitherto pre-

<sup>1</sup> 'Ueberblick über die Geschichte und den gegenwärtigen Stand des physiologischen Problems der Augenbewegungen,' *Zt. f. Psych. u. Phys. d. Sinnesorgane, Abt. f. Psych.*, September, 1907.

<sup>2</sup> 'Eye Movements in Convergence and Divergence,' *PSYCH. REV., Mon. Supp.*, No. 34, 1907.

<sup>3</sup> 'Apparent Control of the Position of the Visual Field,' *PSYCH. REV.*, November, 1907; cf. also Carr and Allen, *Ibid.*, July, 1906.

vailing theories of the varying functions of accommodation and convergence in visual perception. In his painstaking report Scripture does not remove from experimental phonetics the unsatisfactory conclusion that sound curves are faithfully reproduced on the gramophone disc.<sup>1</sup> Leuba's suggestion as to the psycho-physical value of the new chemical methods of controlling color stimuli of definite saturation opens up an easy way for securing new determinations of Weber coefficients.<sup>2</sup>

The higher processes of cognitive consciousness have come in for a measurable share of attention. The recent confusion in the direction of logical and epistemological theories can but be a definite invitation to psychology to enter this region armed with its verifiable methods of analysis. Hoernlé criticises the not uncommon separation of 'image' as psychological from 'meaning' as logical, and holds that 'meaning is inherent in all forms of consciousness.'<sup>3</sup> Every idea or image is 'of something.' Levy has shown the limitation of the usual method of studying associational processes. The subject who is expected to express the first word that occurs in response to a given word-stimulus is placed in an artificial attitude, never known in normal daily life where reactions are to words having a purpose or value.<sup>4</sup> In his attack upon the processes of thinking, Messer advanced the method of approach by closely grading the increasing intricacy of the tests.<sup>5</sup> 'Meaning' is found to have definite value; and, although visual and motor elements were found to be present as images, yet these were not of decided importance in determining the apprehension of meaning. That underlying agreement may be obscured by an over-insistence upon minor differences — a hindrance to which the psychology of the more complex processes seems prone — is well instanced in Pillsbury's reduction of the current theories of judgment.<sup>6</sup> Stripping the views that judgment is belief (Brentano), comparison (Marbe), evaluation (Meinong), the ascription of meaning (logic), and meaning ascribed after doubt or conflict (Dewey), of their unimportant features, he discovers that "in the broad outlines

<sup>1</sup> *Researches in Experimental Phonetics: The Study of Speech Curves*, Carnegie Institution, November, 1906.

<sup>2</sup> *Journ. of Phil., Psych. and Sci. Methods*, March 14, 1907.

<sup>3</sup> 'Image, Idea and Meaning,' *Mind*, January, 1907.

<sup>4</sup> 'Studien über die experimentelle Beeinflussung des Vorstellungsverlaufs,' *Zeitsch. f. Psych.*, 1906.

<sup>5</sup> 'Experimentell-psychologische Untersuchungen über das Denken,' *Archiv f. d. gesam. Psych.*, 1906.

<sup>6</sup> 'An Attempt to Harmonize the Current Psychological Theories of Judgment,' *PSYCH. BULL.*, August, 1907.

there is agreement between all the five definitions. In some form or other judgment is the process that an impression undergoes as it enters consciousness, and this interpretation is always due to the attachment of meaning."

The close approach of pragmatism towards psychology compels a modification of the spirit of our former surveys in which we have deliberately kept from straying into the wider fields of current philosophical interests. Recent reconstructions in logic seem to have been largely responsible for the appearance of pragmatism. The eager hope entertained in many quarters that pragmatism was about to organize itself into a believable system has not been encouraged by the results in England, Italy and America, where the invasion has been most marked. When Schiller contends that pragmatism is but the conscious application of a teleological psychology to epistemology, or, is only an account of human knowing, and knowing is always part of a process which sooner or later issues in action, one cannot help surmising that a change of front has taken place.<sup>1</sup> It is rather noteworthy that it is the philosophers, and not the psychologists, as a rule, who have entered the critical lists either for or against pragmatism. One's disappointment with this assiduously prosecuted new tendency is keen when James, who has been our psychological Moses so long, carries the systematization no farther than to leave it 'a mere mode of approach,' and continues the whole movement a mere program for the future.<sup>2</sup> Papini is more drastic. To him 'pragmatism is really less a philosophy, than a method of doing without philosophy.' "A great many do not yet perceive that there is no such thing as pragmatism, but that there are only pragmatic theories and thinkers who are more or less pragmatic."<sup>3</sup> The counteraction against pragmatism offered by the newly extended application of the genetic method by Baldwin in *Thought and Things*, the character of which was noted with the appearance of the first volume a year ago, is unmistakably indicated in its further development of which glimpses have been offered during this year.<sup>4</sup> It appears in the declaration that the genetic problems of truth will find their solution depending "on these fundamental positions: (1) that truth is a system of objective

<sup>1</sup> *Studies in Humanism*, 1907.

<sup>2</sup> *Pragmatism, a new Name for some old Ways of Thinking: Popular Lectures on Philosophy*, 1907.

<sup>3</sup> 'Introduzione al pragmatismo,' *Leonardo*, Feb., 1907 (tr. in *Pop. Sci. Mo.*, October, 1907).

<sup>4</sup> 'Thought and Language,' 'On Truth,' and 'Logical Community and the Difference of Discernibles,' *PSYCH. REV.*, May, July and November, 1907.

contents set up and acknowledged as under a variety of coefficients of control; (2) that this system is socially derived and socially valid, though rendered by acts of individual judgment; (3) that the whole movement issues in a dualism of self-acknowledging and objects-acknowledged, a dualism from which thought as such cannot free itself.”<sup>1</sup>

The psychology of feeling received an unusual contribution in Ribot’s volume on the passions.<sup>2</sup> This with his *La Psychologie des Sentiments* (1896) and his *La Logique des Sentiments* (1905) constitutes one of the few trilogies in psychological literature, and gives us probably the most exhaustive treatment of what for a long time has been a neglected and backward section of the science. In distinguishing between emotion as brief and unstable, and passion as prolonged and fixed, Ribot revives an older conception of passion which has been somewhat lost sight of in recent years. Passion is intellectually different from emotion, marked by the predominance of a controlling idea, whence it derives its fixity. This elaboration of an effective theory stands in notable contrast with the present practice of studying particular forms of feeling. In experimental investigations, it seems to be not an easy matter to get away from some sort of a test of the James-Lange theory or the Wundt-Lehmann tridimensional analysis. Shepard, for example, finds that the latter theory has no foundation in organic reactions.<sup>3</sup> In giving his clear statement of ‘the discordant situation in the psychology of feeling,’ Johnston has possibly also given the reason why studies on affection continue to occur with least frequency in the labors to advance the science.<sup>4</sup> In his analysis of the complex state of religious consciousness, Pratt finds the chief foundation of faith to be an inner emotional experience.<sup>5</sup> Belief is of three kinds: credulity, intellectual belief, and emotional belief. To each kind there corresponds a characteristic religion. In dealing with the returns of his questionnaire, the effort is to offer a psychological support to such a general view of the religious consciousness as was held, for example, by Schleiermacher.

New problems in individual psychology were suggested in James presidential address before the American Philosophical Association.<sup>6</sup> He contends that there is more of man than ordinary experimental

<sup>1</sup> ‘On Truth,’ p. 287.

<sup>2</sup> *Essai sur les passions*, 1907.

<sup>3</sup> ‘Organic Changes and Feeling,’ *Amer. Journ. of Psych.*, October, 1906.

<sup>4</sup> ‘Feeling Analysis and Experimentation,’ *Journ. of Phil., Psych. and Sci. Methods*, April, 1907.

<sup>5</sup> *The Psychology of Religious Belief*, 1907.

<sup>6</sup> ‘The Energies of Men,’ *Philosophical Review*, January, 1907.

psychology reveals. In view of the fact that men constantly live inside their limits of power, it is proposed that new measurements of energy or will power be made in order to build up the practical pathway whereby men may live on higher levels. The practical recipe of DuBois, the recent translation of whose work may entitle it to mention in this connection, bears marked similarity to the program suggested by James.<sup>1</sup> This disciple of the school of Nancy supports the thesis that 'nervousness is a disease preëminently psychic, and psychic disease requires psychic treatment.' The treatment details accordingly an appeal to the subject's reason, gaining self-mastery, and getting command of one's resources.

In addition to some tendencies in the domain of abnormal psychology already mentioned, there is further evidence of some progressive clearing of this obscure ground. Dreyfus, following the statistical method based on some eighty cases, has conclusively changed some of the divisions in psychiatry fixed by Kraepelin.<sup>2</sup> Melancholia, instead of being, as formerly held, a 'disease entity,' is shown to belong to the manic-depressive group of psychoses. The International 'Symposium on the Subconscious' has crystallized the credos of Münsterberg, Ribot, Jastrow, Janet and Prince, and given us their analyses of the fundamental problems involved.<sup>3</sup> Of the five contributors, but one is a confessed believer in the subconscious as a factor in experience; and the majority seem to agree in regarding the subconscious as a product of interpretation and not as an object of observation, and accordingly favor a physiological rather than a psychological explanation of subliminal phenomena.

Comparative psychology is showing signs of increasing healthfulness as a branch of scientific enterprise. It has already made a wide departure from the old-time observation of the naturalist, and is growing more and more insistent upon facts secured from controlled situations. While passing through the elementary stage of determining the sensory and motor elements in the mental life of animals, this branch of psychology is happily young and plastic enough to reap all benefit from the development of functionalism. The publication of the first volume in the 'Animal Behavior Series'<sup>4</sup> by Yerkes, and Watson's call for a new journal to be devoted to comparative psychology<sup>5</sup> are unmistakable evidences of the rapid development in this field. The

<sup>1</sup> *The Psychic Treatment of Nervous Disorders*, Engl. tr., 1906.

<sup>2</sup> *Die Melancholie: ein Zustandsbild des manisch-depressiven Irreseins*, 1907.

<sup>3</sup> *Journal of Abnormal Psychology*, April-June, 1907.

<sup>4</sup> *The Dancing Mouse*, 1907.

<sup>5</sup> *PSYCHOLOGICAL BULLETIN*, 1907, p. 288.

latter, employing vivisectional methods has repeated and confirmed the admirable work of Small on the acquisition of the maze habit by the white rat.<sup>1</sup> In this definite contribution to the problems and methods, the negative results, showing that visual, auditory, olfactory and cutaneous sensations play no function in the maze behaviors, forces the conclusion that 'the kinæsthetic sensations coupled with the organic probably, and possibly with the static' furnish the guidance necessary. We may ere long be forced to a complete revision of our conceptions of 'mind' as applied to the lower animals.

Some slight modifications in the general classifications adopted by *The Psychological Index* for 1906 do not effect its gross quantitative showing of the fluctuation of interests as compared with the preceding year summarized in the following table.

| 1905.             |   | 1906.             |   |
|-------------------|---|-------------------|---|
| No. of<br>Titles. | Rubric.                                       | No. of<br>Titles. | Rubric.                                       |
| 482               | Higher manifestations of mind.                | 600               | Sleep, trance and pathology.                  |
| 477               | Sleep, trance and pathology.                  | 572               | Genetic, individual and social psychology.    |
| 473               | Genetic, individual and social psychology.    | 518               | Philosophical implications of psychology.     |
| 428               | Sensation.                                    | 383               | Sensation.                                    |
| 270               | Anatomy and physiology of the nervous system. | 344               | Anatomy and physiology of the nervous system. |
| 228               | General.                                      | 275               | General.                                      |
| 135               | Conation and movement.                        | 163               | Conation and movement.                        |
| 128               | Cognition.                                    | 158               | Cognition.                                    |
| 67                | Characters of consciousness.                  | 69                | Conditions and relations of consciousness.    |
| 39                | Affection.                                    | 63                | Affection.                                    |
| <b>2,727</b>      |   | <b>3,145</b>      |   |

This classified productiveness shows more than fifteen per cent. increase over that of 1905, but a total that is still less than that of 1904. All the different fields, except sensation, have notable increases. The last five rubrics retain the rank they have held the past three years.

Psychology continues to hold its own as a leading research science in American universities.<sup>2</sup> It occupies the same rank as that of last year, being third in the class of physics and zoölogy. In 1907 ten doctor's degrees were conferred in psychology, being slightly less than the average number during each of the past ten years which is 13.4.

<sup>1</sup> 'Kinæsthetic and Organic Sensations: Their Rôle in the Reactions of the White Rat in the Maze,' PSYCH. REV., Mon. Supp., No. 33, 1907.

<sup>2</sup> 'Doctorates Conferred by American Universities in 1907,' SCIENCE, August 30, 1907, p. 276.

Progress in the application of the 'clinical' method now fostered at the University of Pennsylvania and Harvard University may encourage the hope of seeing greater socio-economic values placed upon the science in American community life.

The geographical and qualitative expansion of the interests of psychology have been furthered by the establishment of new channels for periodical literature. The supplementary series of special issues conducted by the PSYCHOLOGICAL REVIEW is to be enlarged by the addition of a series of *Philosophical Monographs*, edited by Baldwin. *The Psychological Clinic*, edited by Witmer, in connection with the psychological laboratory of the University of Pennsylvania, is timely evidence that the science is conscious of the practical need of getting into closer touch with everyday life. This journal is born of the 'impulse to seek to establish a comparative psychology, more particularly a child psychology, upon a secure foundation,' and will be the organ of the 'clinical' method. The *Clinic* and the movement behind it may ere long give us the expert practical psychologist, that ideal officer in our educational system desiderated by Royce some years ago. The new *Zeitschrift für Religionspsychologie, Grenzfragen der Theologie und Medicine*, edited by Bresler and Vorbrot, is to follow the program of the psychology of religion, the anomalies of religion and the development of religion by the 'psychagogics' of practical theology. Psychology is to receive some literary credit in the newly announced *Revue Générale des Sciences Psychiques* and *Rivista di Scienza*. The latter is designed to promote a scientific synthesis, in which psychology is to share with eight other sciences.

In the deaths of Professor C. E. Garman, of Amherst College, Dr. P. J. Möbius, of Leipzig, and M. N. Vaschide, of the Laboratory of Pathological Psychology of the University of Paris, the science lost this year the notable services of a constructive teacher, of a brilliant writer, and of an industrious investigator.

## PSYCHOLOGICAL LITERATURE.

### MENTAL FUNCTIONS.

*Erscheinungen und psychische Funktionen.* C. STUMPF. Repr. fr. 'Abhandl. d. Preuss. Akad. d. Wissenschaften,' 1906. Berlin, 1907. Pp. 40.

In this paper Professor Stumpf offers a complete analysis and classification of consciousness, the 'immediately given' (pp. 6 ff., 28 ff.),<sup>1</sup> into (*a*) phenomena (*Erscheinungen*), (*b*) psychic functions, (*c*) relations, and (*d*) forms (*Gebilde*). These terms he defines with care. By (*a*) phenomena Stumpf means sensational contents, whether peripherally or centrally excited (p. 4). By (*b*) psychic functions he does not mean functions in the teleological-biological sense of contemporary psychologists (p. 5); he refers, rather (p. 4), to 'acts, conditions, experiences (*Akte, Zustände, Erlebnisse*)',<sup>2</sup> of which he enumerates (p. 16 ff.), perception, or perceiving, consciousness of relation, or thinking, combining (*Zusammenfassen*), judging, emotion, and will. (*c*) Of relations he distinguishes three sorts: Relations of phenomena with each other, relations of functions with each other, and relations between phenomena and functions (p. 7). (*d*) He describes forms as the 'necessary correlate' and the 'content' of the intellectual and of the emotional functions. He instances 'conceptions,' 'judgments,' and 'values.'

The paper is largely occupied, as its title suggests, in urging that phenomena and psychic functions, as thus defined, vary independently of each other, and that consciousness cannot, therefore, be described exclusively in terms either of phenomena or of functions. This emphasis on phenomena and on functions should not, however, obscure for the reader the significant teaching about forms and relations. Critics will differ in their estimate of Stumpf's arguments (pp. 16-28 and 34-37 *passim*) in support of this conviction that phenomena and functions may vary independently of each other. With characteristic candor, he himself points out that these arguments establish the probability, not the certainty, of his conclusion; but even without them, as he rightly maintains, our direct consciousness of the psychic function establishes the fact of its occurrence. Detailed consideration of the arguments for

<sup>1</sup> References are to the pages of the reprint.

<sup>2</sup> I do not understand how the term *Zustand* can rightly be used as synonym of *Akte* and *Erlebniss* with their implication of activity.

this independent variability of function and phenomenon may therefore without disadvantage be omitted in favor of a more general comment on Stumpf's account of consciousness as a whole.

In the opinion of the present writer Stumpf is entirely correct in his main contention (p. 38) that our consciousness as immediately given is not reducible to purely sensational terms. More than this, he is justified in insisting that we are immediately conscious not only of perceiving, thinking, feeling and willing—in his terms, of psychic functions—but also of relations and of forms. And, finally, as readers of Stumpf do not need to be told, his descriptions of psychic experiences are throughout illuminating—full of keen analysis and of fine discrimination.

The deficiencies of Stumpf's analysis are, however, no less evident than its merits, and they demand more extended treatment. In the first place, from the standpoint of his own statements, it seems clear that phenomena (sensational contents), relations, and forms should be classed together under some such heading as 'contents of consciousness,' and should then be contrasted with psychic functions. Stumpf's objection to this procedure arises from his conviction, apparently a form of metaphysical realism, that phenomena as distinguished from functions have a certain objectivity and independence (cf. pp. 11-14, 36). But the arguments which he employs (p. 32) to show that the judgment and the notion are not to be conceived independently of psychic function would tell as strongly, *mutatis mutandis*, against the doctrine that the sensational content is independent of the function of perception. In other words, Stumpf is inconsistent in refusing to admit (p. 11 ff.) that the sense-content implies the psychic function while at the same time he insists (p. 32) that forms and relations are correlatives of intellectual and emotional functions.

A second disagreement of the writer with Professor Stumpf concerns his objection (p. 9) to the teaching that the consciousness of self is directly contained in that of the psychic function. The objection is presumably due to the mistaken view that a consciousness of self implies a high stage of psychic development. On the contrary, the conception of the psychic function as essentially the function of a self means only that there is no possible consciousness of 'a perceiving (*ein Wahrnehmen*),' which is not really a consciousness that I am perceiving; and that similarly the other psychic functions—feeling, willing, and the rest, are inadequately described except as the consciousness, however unemphasized, of a feeling and willing self.<sup>1</sup>

<sup>1</sup> Cf. a paper by the writer in *The Journal of Philosophy, Psychology and Scientific Methods*, 1907, IV., pp. 673 ff., where this proposition is defended

The discussion of these criticisms would lead too far afield; and no further comment on this paper can be so useful as the urgent counsel to the reader of this notice to refer to the original.

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### CLASSIFICATION OF THE SCIENCES.

*Zur Einteilung der Wissenschaften.* C. STUMPF. Repr. fr. Abhandl. d. Preuss. Akad. d. Wissenschaften, 1906. Berlin, 1907. Pp. 94.

The conceptions of phenomenon and of psychic function, as outlined in the paper just reviewed, lie at the basis of the classification of the sciences proposed by Stumpf in the second of his contributions to the *Abhandlungen* of the Prussian *Akademie der Wissenschaften*. At the outset, and again in conclusion, he pronounces in favor of a classification based, frankly, on several principles. A division proceeding on strictly logical principles leads, so he holds, to artificial distinctions and to an unnatural subordination of one science to another.

Stumpf's first division is accordingly into the nature sciences, the mental sciences (*Geisteswissenschaften*), and the neutral sciences. This is a classification according to object (*Gegenstand*), and the object of a science is described as a conceptual form (*Gebilde*, p. 6 ff.). Even the individual, Stumpf points out, is described in conceptual terms. Such a conceptual form is, he adds (p. 9), posited as identical for all thinkers. (1) The nature sciences are distinguished, from this—the most fundamental—standpoint, in that their objects are 'the bearers (*Träger*)—ordered in spatial-temporal relations—of regular changes, inferred from phenomena.' An emphasized feature of this conception (p. 13 ff.) is the teaching that mere phenomena are not the objects of the nature sciences. Color and the other specific qualities, and even sensible space, do not belong to the world of the physicist, who deals rather with purely mathematical formulæ and with their hypothesized 'bearers,' namely, 'a world of things existing independently of consciousness but related within itself according to causal laws.' (2) The objects of the mental sciences are the psychic functions as objects of thought, and their subjects, or 'bearers.' The main distinction within this second group of sciences is that between psychology, the science of the elemental psychic func-

with greater vigor. Cf. Stumpf's paper 'Zur Einteilung der Wissenschaften' for implicit admission of this doctrine by the teaching that psychology may discuss the 'subject' of the function.

tions, and the sciences of the more complex social functions, for example, sociology and the science of religion. (3) Under the head of 'neutral sciences,' Stumpf next proceeds to define, on the one hand, metaphysics (the science of the connection of all objects, especially with reference to the criterion of reality, p. 42 ff.), and on the other hand, a group of allied sciences usually treated as aspects of either or both the nature sciences and the psychic sciences. These are (1) 'phenomenology,' or the science of phenomena—and, under this head, Stumpf would study all the sensible qualities, color, sound, warmth, and the like (p. 26 ff.), and (2) eidology, or the investigation of 'forms'—and here would fall the investigation, on the one hand, of logical concepts, and, on the other hand, of 'values' (p. 32); and finally (3) the study of relations.

It will be observed that Stumpf, although disclaiming a division on a single principle, has really brought all save two of the sciences under the headings of this division on the basis of conceptual object. These two, which he does not include in this classification, are, in the first place, history, which he describes as dealing primarily with individual and with fact, as opposed to law (p. 47 ff.); and, second, mathematics, defined (in one of the most valuable sections of the paper), as the science of the 'homogeneous' form conceptually gained, through abstractions and definitions, from the phenomenal (p. 76, adapted). As thus defined, history is really, on Stumpf's principles, a mental science, and mathematics a branch of eidology; but Stumpf holds that this subordination minimizes the actual importance of these sciences and therefore, as has just been stated, he regards each as *sui generis*. Similarly, he distinguishes ethics, aesthetics, pedagogy, and the like as 'practical' in contrast with 'theoretical' sciences, though he has already referred to them as branches of eidology. And finally, he defines philosophy with express intent to include within it all the sciences of the traditional faculty of philosophy.

This inadequate summary of a paper rich in suggestion has left many of its important features untouched. Mention must be made of the enumeration (p. 38) of the problems of the doctrine of relations; of the careful distinction (p. 81) of the *a priori* from the innate; and, most significant of all, of the very valuable discussion (p. 49 ff. and 80 ff.) of logical necessity. As I understand him, Stumpf conceives of logical necessity as the connectedness of concepts, learned with immediate assurance, by analytic attention; and he contrasts it with 'real necessity,' the connectedness of phenomena learned with assurance through repeated experience.

An obvious criticism of Stumpf's classification has already been indicated. It is, after all, more logical than he is willing to admit, for all his sciences are, in the end, classified according to object. The most unessential of his main classes is that of the neutral sciences, since he attempts to coördinate phenomenology neither with eidology nor with the doctrine of relations—and still less with metaphysics. Indeed, he does not, in the opinion of the present writer, make good his exclusion of phenomenology from psychology. The other criticisms to be made concern Stumpf's fundamental teachings rather than this specific problem of the classification of the sciences: (1) The realism, prominent especially in his definition of the nature sciences, is nowhere argued, but is merely asserted, and is virtually yielded both by the admission that the world, supposed to be independent of consciousness, is an object of thought (*ein Gedachtes*), and by the conception of the object-independent-of-consciousness as in spatial and temporal relations. For 'spatial' and 'temporal,' as Stumpf has abundantly shown, are terms with a purely phenomenal significance and cannot be turned into extra-mental relations by an arbitrary act of hypothesis. Incidentally, it may be noted that the conception of 'bearer (*Träger*)' when it is not conceived as self, has no more validity— spite of Stumpf's disclaimer — than Locke's substance, an 'I know not what.' (2) In the second place, Stumpf's repeated assertions that psychology deals not only with psychic functions but with the subjects of these functions serves as a needed correction of Stumpf's own teaching in that it virtually identifies *Funktionspsychologie* with *Ichpsychologie*. For the subject of the psychic function can be none other than the conscious self, or I.

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### EDUCATION.

*Motives, Ideals, and Values in Education.* WILLIAM ESTABROOK CHANCELLOR. Boston, Houghton, Mifflin & Co.

One would hardly expect the author of a series of arithmetics, and a volume like *Our Schools*, to produce such a book as the *Motives, Ideals, and Values*, which keeps as far away from the concrete work of teaching as it is possible to get. The book is really a philosophical and ethical reflection upon the fundamental bases of life, society, and education. Hardly anywhere throughout the entire five hundred closely printed pages is there a suggestion even of the practical interests and activities of the author; and it is difficult to conceive how

it could have been written amid the distractions and under the pressure of a superintendent's office. The topics chosen for discussion, the point of view taken in treating them, the extraordinary quality of the style, the absence of current and conventional educational terms and phrases — all make this volume an exceptional one in educational literature.

Chancellor devotes himself principally to a study of civilization — its nature, its institutions, its tendency toward degeneracy under urban conditions, the requisites for a stable and progressive civilization, and so on. For his principles he draws upon a large group of sciences — upon history, psychology, physiology, anthropology, social science, theology, mental development, pathology, biology, logic, ethics, æsthetics, philology, and education in its history, theory, and practice. The present reviewer cannot now recall any other educational writer, past or present, except Hall, who draws his data from so many and diverse sources. He has apparently read the best in a great variety of fields, and has assimilated it sufficiently for his purposes. If the author declared it as his aim to expound a science of educational ideals and values, one might complain that he has not presented the views of his authorities with sufficient accuracy, definiteness, and precision, and has not shown how their conceptions bear upon educational theory and practice; but obviously it has not been his intention to be scientific, or pedagogic in a strict sense. His book is ethical and aspirational; it achieves its end by deeply stirring the emotions, rather than by appealing strongly to the intellect in the effort to establish a system of scientific principles relating to education. The style of the book is not well adapted to scientific exposition; it is better suited to convey the feelings and reflections of the poet and moralist and humanitarian. The Bible and the poets of western civilization especially are quoted very freely, and the quotations seem entirely in harmony with the spirit and method of the text.

The author's *Our Schools* is a book for the practical, working teacher; its suggestions fit in with the dynamic life of the schoolman in action. But this later book is for the leisure hour, the hour of meditation, when thought may free itself from immediate problems, and roam unhindered over vast domains of human interest, activity, and achievement. While it is essentially dynamic, it is nevertheless so far removed from the concrete and actual in teaching that it ought not to be regarded as of service in the practical life, except in a very general and subtle way.

I doubt not that the schoolman who comes to this book for edu-

cational facts and principles directly and simply stated will be disappointed. He will feel that principles have been to some extent sacrificed to erudition and literary art. He will be troubled by the frequent occurrence of unusual terms; and he will at once see that the author employs a vocabulary and a rhetorical style which are quite different from the simple and homely forms supposed to be best suited to the needs of the practical life. But for one who prefers literary excellence above simple directness and precision of statement, Mr. Chancellor's book will prove a constant pleasure. He is a master of words in most of the uses to which they can be effectively put. To the present reviewer it appears that the form of expression is well suited to the content to be expressed. There is a largeness, a dignity, a virility about both the thought and the expression which lift the book far above the typical volume on education. And the reader is all the more appreciative when he realizes that the work has been done by a man immersed in the multitudinous details of administering a great system of schools.

It would be altogether out of place to attempt here to estimate the reasonableness of the various positions taken in the book. The reviewer found himself raising questions frequently as he went through the chapters; but in the end it seemed to him that the book was to be judged primarily by the impression which it made as a whole, and not by the scientific validity of its various propositions. Dealing in general conceptions and in ideals as the book does, it is not likely that any reader will endorse without question all that he reads, though I believe that in the large it is in accord with contemporary scientific thought. Of course, when an author devotes himself to depicting what he conceives ought to be instead of describing what is, he cannot expect that those will have the same outlook that he has who have not the same backward view, or who do not place the same values upon the institutions of the immediate present.

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*Contribution à la pédagogie de la lecture et de l'écriture.* O. DECROLY and MME J. DEGAND. Archives de Psychologie, VI., 339-353.

The authors report several experiments performed in the *Institut d'Enseignement Spécial* of Brussels, with the purpose of finding a rational method for the teaching of reading and writing to children of defective hearing. It will be seen that the authors have worked along

principles which form part of the well known 'oral' system of instructing the deaf and dumb, successfully applied in this country by Dr. Alexander Graham Bell and others. The results indicate (1) the greater efficiency of the sentence method over the word or syllable method in reading and (2) the surprising fact that in the graphic reproduction of the written language, the shorter the duration of the visual stimulus, the quicker and better are the results.

The subject, a boy five and one half years old, is shown different letters of the alphabet, syllables, words referring to sensible objects, and sentences referring to acts, each on a separate card. The investigators explain to him at the same time the meaning of each written image by performing the acts, by pointing out the objects and by articulating the syllables and letters. The child is then required, in being shown the cards, to interpret what he sees by making the proper motor response. A similar method is followed in the experiments on writing. Here the child is required to describe, by means of graphic language, the acts and the objects which he sees, or to reproduce simply written sentences which are shown to him. In the following figures are summed up the results of the various tests.

|            | Percentage of Retention. |
|------------|--------------------------|
| Letters,   | 47.6                     |
| Syllables, | 52.3                     |
| Words,     | 68.1                     |
| Sentences, | 90.7                     |

This refers to reading. As for writing, "we realized," say the authors, "that it was better to let him examine the sentence to be written only during a very short time. We showed the child, during 30, 10, 5, 2 and 1 seconds, cards on which different sentences were written." The sentence *la boule balance* was successfully reproduced after it had been shown 6 different times and during 10 seconds each time. Total, 60 seconds. The sentence *la boîte roule* did not require more than 5 presentations of 5 seconds each. Total, 25 seconds. This amount was still lowered in the case of the sentence *le papier glisse*, for the correct reproduction of which 4 repetitions of 2 seconds each were sufficient. Total, 8 seconds. The authors say nothing as to the anomaly, at least apparent, of these results which flatly disagree with all known facts regarding the relation between retention, on the one hand, and duration of the stimulus on the other. It would be highly interesting, both psychologically and pedagogically, to clear up this important point by performing similar experiments on large groups of pupils.

L. SINAGNAN.

## MEMORY.

*The Initial Tendency in Ideal Revival.* FELIX ARNOLD. Amer. J. of Psychol., 1907, XVIII., 239-252.

This article treats of certain characteristic tendencies of the memory process on the basis of association tests made by the author with school boys.

Arnold's tests were carried on with about forty boys in the sixth year in school. A poem was used which they had memorized for school purposes. No emphasis was laid on rhythm. A portion was selected for each test. The boys were told that when one word of the poem was spoken they were to write down at once the first words which occurred to them from that part of the poem which had been selected. The results were classified under three heads:

1. Certain cases in which there was what the author calls a 'fromward' tendency — *i. e.*, the tendency to recall the poem beginning with the cue word and going forward.

2. The 'initial' tendency — *i. e.*, the tendency when a word is presented to go back to the beginning of the whole section of the poem to which the cue belongs and to revive from the first the complete section.

3. Blank — where no words were immediately recalled.

Nine tests were taken lasting through several months. Out of 1,917 trials there were 705 cases of 'initial' tendency; 1,182 cases of 'fromward' tendency, and 30 blanks.

In discussing the results Arnold reviews briefly the views of Hartley and Herbart as representing the atomistic conception of the Associationists; and of Ebbinghaus, Müller and Schumann and Müller and Pilzecker representing the more recent investigations of memory processes. Arnold points out that especially the 'initial' tendency disproves any atomistic conception of stored, discrete units. Nor can such a tendency be explained by mediate suggestion as might the cases showing the 'fromward' tendency. The cases of 'initial' tendency, the author believes, can be explained only by considering any given moment of consciousness to be a '*disposition*' containing 'a meaning and a tendency to explicate the series implicit in it.' Any given word from a group formally learned revives this total '*disposition*.' Indeed the presence of the 'fromward' tendency points in the same direction. In this case the whole series is also involved.

Arnold found that the boys who had most thoroughly learned the selection had the greatest 'initial' tendency. This he thinks affords another proof of his theory, for in such cases there would be a better organized disposition. Arnold mentions certain 'initial' tendencies

found in children who are learning processes. When any mistake occurs the tendency is to rub out the whole of a drawing; to pull down the whole block-house; to begin all over in reading. These show, he thinks, that serial unity has been destroyed, so the whole series has to be gone through *in toto* before any meaning will result for the child. These 'initial' tendencies in children, Arnold thinks, should be encouraged.

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*Memory for Lifted Weights.* E. A. HAYDEN. Amer. J. of Psychol., 1906, XVII., 497-521.

The object of this investigation was to 'study the influence of the interval upon the accuracy and quickness of recognition,' and to 'determine the mental processes involved in comparison and recognition.' Eight Jastrow weights ranging from 20 to 600 gms. were used. The experiment consisted in requiring the subjects to lift two weights chosen in irregular order, and to judge whether the second was equal to, heavier or lighter than the first. The reaction time of the judgment was recorded. Eight standard time-intervals ranging from 20 to 120 seconds were interspersed between the lifting of the first and the second weight.

The results obtained from five observers show that the 'interval of 40 to 60 seconds seems the most favorable for the judgments, so far as this is indicated by maximum percentage of right cases, minimum length of reaction time and mean variation.' In most of the judgments the weights compared were placed at definite positions in a scale of values. The memory image of the first weight usually disappeared when the lifting of the second weight began, and apparently it played a rather insignificant part in the judging process.

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#### PSYCHOLOGY OF PREJUDICE.

*The Psychology of Prejudice.* JOSIAH MORSE. Int. J. of Ethics, 1907, XVII., 490-506.

The writer of this article prefaces his remarks by the statement that in the rapid progress made in psychology in the recent years practically nothing has been written upon the most common everyday mental experiences, such as hope, despair, friendship, courage, etc. The reason for these omissions, he states, must be due first, to the common-

ness of the subjects; and secondly, because of the time-honored fallacy that 'acquaintance with' is synonymous with 'knowledge about.'

That prejudice is universal and ubiquitous may be difficult to substantiate, but with a little license we might maintain that this psychic flaw runs through the whole warp of the universe, and we have unconsciously assumed this whenever we personify nature, and speak of her likes and dislikes, etc. The gods of the various peoples have had their prejudices without number. Indeed, an unbiased god would not be worshiped or prayed to, as he would have no personality, no human attributes, and be as abstract as law or the absolute, which no people have ever truly worshiped. All living things which have individuality and personality are biased by reason of their limitations: which is as true of anthropomorphic gods as of men and the lower animals. Man's inherited tendencies determine what impressions shall be received and what rejected. We recreate the universe, each in his own limited imperfect way, and the worlds of no two are exactly alike.

Mr. Morse takes issue with Professor Patrick, who has defined prejudice, in its ordinary signification, as follows: "An individual deviation from the normal beliefs of mankind, taking as the standard, the universal, the general, or the mean." This definition limits prejudice to the intellectual type which, Mr. Morse says, will not hold even within these narrow confines; for, according to this, Socrates, Jesus, Galileo, Bruno, Luther, Darwin, and a host of other reformers were prejudiced, which is manifestly absurd. Prejudice does not consist in deviating from a popular standard, but in an *undue prepossession* in favor of, or against anything, be that what it may. Psychologically speaking, any inordinate reaction of the higher centers to an object is prejudice. The criterion of undue or excessive prepossession is found within the individual himself, in the effect which it has upon his general development in life.

In regard to the psychological meaning of prepossession, issue is again taken with Professor Patrick, who says in substance that prejudice is synonymous with apperception. The writer holds that prejudice is not apperception but rather an arrest of it. So long as the apperceptive process is allowed to function normally there is no danger of becoming prejudiced. It is only when this process is arrested or interfered with, that the danger arises. Prepossession means disordered apperception. The unduly prepossessed individual either cannot or will not apperceives properly; he apperceives only as suits his purpose, which has been determined by his will and desire.

Here we see clearly the emotional and volitional roots of prejudice — roots which penetrate the whole soil of subconsciousness, vitiating our thinking and determining our attitude to our environment. Were we passionless we might apperceive properly, and be without prejudice, therefore, what is normal in a certain measure, becomes abnormal when that measure is deficient or excessive. Error or evil is located in deficiency or excess. Even excessive virtue is evil, excessive humility being abjectness; courage, rashness, etc.

The confusion of apperception with prejudice is due to a misinterpretation of the fact that the apperception-masses which one has accumulated in his lifetime react partially to a given idea or situation. This may lead to an erroneous view of things, but not necessarily to prejudice. Apperception is instinctive judgment of resemblance between any given object and a similar one. In prejudice, however, the judgment is neither correct nor logical; it is willfully warped, and, as a rule, in spite of one's better reason; not a partial, erroneous judgment, therefore, due to limited experience, but a willful perversion of judgment because of interest and passion — love, hate, anger, jealousy, envy — is prejudice. Also, while in apperception resemblance is the great factor; in prejudice it is difference.

We cannot tell at just what period in life prejudice first shows itself, but a somewhat similar feeling, jealousy, appears very early in the child's life, some having seen manifestations of it in the third month, and many in the twelfth or thirteenth months. Perhaps prejudice appears equally early, but it requires for its existence a rather full development of the will and the emotions, and a larger organization of the intellect.

Speaking of education the writer says that pedagogy must be very careful, in evolving new methods of study, to remember that education is more than instruction and that it is possible to cultivate prejudices instead of removing them. Prejudice, however, is rather a by-product of education than an effect of it.

In conclusion, the writer points out that an idea, because of repetition, association or other circumstances, occasionally acquires more than its share of dynamic energy, and mental activity thus becomes polarized around one or several concepts instead of being properly proportioned among all. In extreme cases among religious fanatics, ascetics and mystics, there is only one pole. Arranging individuals according to a scale of ideas, we would have mono-, bi-, tri-idealist, etc., passing from the extremely prejudiced to the liberal and critical. Mere richness of content in consciousness gives rise to a greater possi-

bility for prejudices to lurk in the mind, — the uncultured adult living in a civilized community has more and stronger prejudices than a savage, — but richness combined with harmony precludes such a possibility.

BENJ. G. DEMAREST.

NEW YORK UNIVERSITY.

### LAUGHTER.

*Le rire hystérique.* José INGEGNIEROS. Journal de Psychol., 1906, III., 501-518.

The author calls attention to the fact that there are several forms of laughter and no one definition can be complete. We may distinguish three factors in laughter, which enter in varying degree and may manifest themselves separately: (a) The mimetic, motor element; (b) the emotional element; (c) the intellectual element, the representative act.

There is also a special pathology affecting each of these elements. Thus hysterical laughter is the convulsion of a group of muscles corresponding to the function of laughter; and laughter accompanying a painful condition, or the irresistible laughter following a trifling cause are cases of the emotional pathology. It seems to me that this is mainly a classification which is probably of value for some clinical purposes, but theoretically is at least insufficient.

Ingegnieros criticises both extreme interpretations, the one making hysterical laughter a mere epiphénoménon of the convulsive attack, the other making it the accident itself, a functional tic. He gives a classification with these two main divisions. In the first, the laughter is an epiphénoménon, and shows itself either as (a) aura of the attack, (b) complication, or (c) symptom of the breaking up of the attack. In the second the laughter is an independent accident, and is either (d) the only symptom, (e) a paroxysm alternating with other symptoms, (f) permanent.

The author then gives the history of a case of hysterical laughter of genital origin. The patient suffered from paroxysms of laughter accompanied by loss of consciousness. In the intervals she had some headache and nausea. There was a slight increase of the tendon reflexes, hypoesthetic zones under the right breast and on the right arm, complete anaesthesia of the pharynx, and some narrowing of the field of vision. The central factor in the treatment was by hypnotizing and suggesting hysterogenic zones and inhibiting zones of the attack. It was successful.

JOHN F. SHEPARD.

UNIVERSITY OF MICHIGAN.

## RACE PSYCHOLOGY.

*At the Back of the Black Man's Mind.* R. E. DENNETT. London, 1906.

The writer believes, after a careful study of the Kongo region, that the native mind, in both political and religious spheres, has developed much more profound conceptions than has been supposed. Older than the fetishism (*Ndongoism*) usually observed by travellers, and by them imagined to be the sole religion of Africa, exists a much deeper religion and philosophy (*Nkicism*) which bears about the same relation to fetishism that Buddhist philosophy does to popular Buddhism.

The Bavili mind seems to have thought in a dialectic — shall we call it? — of four terms and six categories. The four terms, or divisions, are abstract cause, male and female causes, and effect. Thus the name for God is *Nzambi*, which means literally, ‘the personal essence of the fours.’ God thus consists of four parts: “(1) God the abstract idea, the cause, (2 and 3) *Nzambi Mpungu*, God Almighty, the father God who dwells in the heavens and is the guardian of the fire, *Nzambici*, God the essence, the God on earth, the great princess, the mother of all the animals, the one who promises her daughter to the animal who shall bring her the fire from heaven, (4) *Kici*, the mysterious inherent quality in things that causes the Bavili to fear and respect” (p. 167). This dialectic of cause and effect becomes still more complicated into an elaborate formula (p. 167). There are six sacred symbols associated with god (*Nzambi*) on the one hand, and the king (*Maluango*) on the other, viz., sacred groves, lands and rivers, trees, animals, omens, the seasons. Corresponding to these symbols, the king has six titles, and performs six distinct functions of government, assisted by six distinct kinds of subordinates.

Particularly in the study of the groves and the seasons, but to some extent also in the other symbols, the genetic movement in four terms is distinguishable, and all are thought in association with six categories — water, earth, fire, procreation and motion, fruitfulness, life.

The Bavili also have a considerable body of law, covering especially the family, property, contracts, criminal law, and judicial procedure (palavers). They had a judicial system, with the king (*Maluango*) as the court of final appeal.

The advanced philosophical conceptions described were not of course obtained from direct conversation with any of the natives now living, but are the result of a careful investigation of the institutions, traditions, customs, and practices of the people. The justification for

the interpretation rests upon the hypothesis that the present Kongo tribes have degenerated from an era of much higher intelligence and reflection. Some evidence for this view is given, and similar data were derived from an observation of the Bini tribes, with which the writer also sojourned for a considerable time.

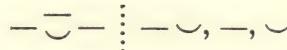
W. K. WRIGHT.

UNIVERSITY OF CHICAGO.

### RHYTHM.

*Der Rhythmus der römischen Kunstprosa und seine psychologischen Grundlagen.* TH. ZIELINSKI. Archiv für die gesamte Psychologie, 1906, VII., 125-142.

The author of this paper has investigated the rhythm forms found at the ends of the periods in Cicero's orations. The total form in question is divided by him into two parts, the base and the cadence, separated by a cesura. The base is usually a cretic (—˘—); the cadence consists of either a single trochee, or one and a half, or two whole trochees. If the cadence consists of more than a single trochee, the cretic of the base may be replaced by a molossus (—˘˘). These five forms may be graphically represented together thus:



The author calls these five forms the *preferred* forms. If any of the long syllables are dissolved into two short ones, we have a *tolerated* form. There are 18 tolerated as compared with 5 preferred forms. All others he calls the *forbidden* forms. These terms are justified by the frequency of the forms of rhythm. The author finds that among 17,902 period endings 60.3 per cent. have the preferred, 26.5 per cent. the tolerated, 13.2 per cent. the forbidden form. Taking into account that the number of divers tolerated forms is 18, that of preferred forms only 5, one may say that each preferred form has, on the average, 12 per cent. representatives, each tolerated form only 1.5 per cent. In order to make sure that this numerical relation is the result of a psychological law, the author has divided the orations into ten chronological groups. In the first of these groups the percentages of preferred and tolerated forms are respectively 52.5 and 27.9; *i. e.*, Cicero's preference of the five preferred forms was then, in his youth, not quite so strong. But in the third group of orations the percentages have already changed to 61.2 and 26.6, which thence remain practically constant. The author points out that Cicero, judging from his own remarks concerning oratory and its rules, was

entirely unconscious of any such law. Among the preferred forms the one consisting of a cretic and a trochee is by far the most common. It is found in 4,184 of the 17,902 cases. The same form but with the first long syllable dissolved is found 436 times; *i. e.*, in about 10 per cent. of the number of the form from which it is derived. The other four forms, similarly derived from the other four preferred forms by dissolution of the first syllable, appear also in about 10 per cent. of the numbers of the forms from which they are derived. These and other regularities prove that the period endings of Cicero's orations are governed by a definite rhythmic law.

MAX MEYER.

UNIVERSITY OF MISSOURI.

## DISCUSSION.

### THE EGO AND EMPIRICAL PSYCHOLOGY.<sup>1</sup>

In his President's Address, last March, before the Western Philosophical Association, Professor Pillsbury considered what is, in my view, the most fundamentally important of the modern issues of psychology. I wish, therefore, that I more clearly understood the conclusion which he reaches. In the second paragraph, as well as later on in his address, he refers with evident disapproval to upholders of that which he calls the 'self-construction' who, as he thinks, 'abandon logic for emotion.' But in the final paragraph, in which he sums up his own doctrine, we find the following statements: "The self is merely all that we are and know, organized, self-unified, and self-identical, a growing vital unity that as a whole is effective in every experience. . . . It is unity with multiplicity, identity amid difference. . . . It is a principle of explanation, but is immanent, not transcendent, effective, not shadowy. It is . . . something empirically known, nothing mystical or mysterious in its nature or actions." All this is in such perfect accord with the conception of the self as basal fact of psychology that without the testimony of other sections and clauses of the paper one would be tempted to welcome Saul to the band of the prophets—in other words, to count Mr. Pillsbury among those whom he calls 'paper architects of the self.'

The address falls naturally into two parts: a defence of structural psychology in the form of a criticism of self-psychology; and, following on this, a constructive supplementation of structural psychology.

<sup>1</sup> 'The Ego and Empirical Psychology.' Read as the president's address before the Western Philosophical Association at Chicago University, March 29, 1907. Printed in the *Philosophical Review*, 1907, Vol. XVI., pp. 387-407.

The objections to self-psychology reduce to the following: It does not, in the first place, concern itself with 'the experience immediately given,' but rather 'with what must be assumed as the foundation of the experience' (p. 387). Again, 'sometimes the self-construction is welcomed as a means of avoiding conclusions admitted to be adequate from other premises' (p. 388). And, finally, the conception of a self is irreconcilable with the conception of the 'mental stream' (pp. 388-391).

Two of these criticisms are, I think, founded on misapprehensions. For, first, the self regarded as basal fact of psychology is conceived not as a philosophical or epistemological explanation of experience, but as a concretely and directly experienced fact — a 'what is' and not a mere 'what must be.'<sup>1</sup> And, second, Mr. Pillsbury has certainly missed the meaning of my teaching about will, to which he refers as his only example of the self-psychologist's tendency to cut loose from thought and 'to give way to emotion.' He represents me (p. 388) as 'satisfied of the correctness of the modern conclusion that will is no peculiar aspect of consciousness,' but as holding 'that a self is in some way conscious of a difference that we cannot find.' Mr. Pillsbury does not cite the passage which he takes as foundation for this intended paraphrase of my views, but I think that he refers to one of the closing paragraphs of my address on 'A Reconciliation between Structural and Functional Psychology.'<sup>2</sup> Here I say that "the modern school of structural psychology rightly, as it seems to me, teaches the impossibility of discovering in experience a peculiar volitional element." I add that this denial 'does violence to the plain outcome of introspection which sharply contrasts will with other sorts of consciousness'; and I conclude that in order adequately to describe will one must supplement the analysis into structural elements by an analysis of will conceived as personal relation. I am sorry that the statement of my partial agreement with the merely structural psychologist has lent itself to misconstruction. I do agree with him that there is no volition-element, in the sense in which there is a sensational element. But, so far from agreeing with

<sup>1</sup> Cf. Ward, 'On the Definition of Psychology,' *British Journal of Psychology*, 1904, I., 23, 25; and Judd, *Psychology. General Introduction*, p. 316: "Our considerations have led us along strictly empirical paths to the recognition of the self." For my own assertions of the immediacy of the consciousness of self, cf. *An Introduction to Psychology*, p. 151 et al.; *Der doppelte Standpunkt in der Psychologie*, p. 34 et al.; and especially 'A Reconciliation between Structural and Functional Psychology,' *PSYCHOLOGICAL REVIEW*, 1906, XIII., 67-68 (with note).

<sup>2</sup> *PSYCHOLOGICAL REVIEW*, loc. cit., p. 79.

him in the teaching that ‘we cannot find’ a difference between will and other experiences, I firmly believe that we do find, that is, immediately experience, such a difference. Thus, the contrast between the structuralist’s account of will (correct from his point of view) and the actual experience of will is the sufficient evidence of the inadequacy of the structuralist’s conception. The argument seems to me to be precisely parallel with that which leads Mr. Pillsbury to undertake his constructive addition to structural psychology.

There remains the objection that the conception of the self is ultimately irreconcilable with that of a mental stream—in other words, with the conception of consciousness as consisting in a series of mental states. This will cheerfully be admitted; but it will be urged, by every self-psychologist, that the conception of a series of mental states is a scientific (if not, indeed, a metaphysical) abstraction—a hypothesis sometimes useful for purposes of description but in no sense a fact of experience. Thus the self-psychologist, assured from introspection that every alleged experience of a mental state is really an experience of oneself being conscious, sees no need of squaring his immediate experience with this abstract conception of the mental stream.

I shall speak more briefly of Professor Pillsbury’s positive contribution to the discussion, because I realize that he may have some meaning which I utterly miss. He begins (p. 392, end) by admitting that “the structures ordinarily analyzed out by structural psychology will not explain the functions that we find mind capable of when viewed in the large.” He is therefore led to attempt a ‘construction on the basis of fact’ which shall satisfy ‘the real need . . . for unity and identity of mental states’ (p. 393). The facts which he adduces are, first (p. 393), that “associations years old, of which there was no trace in the ordinary sense of spontaneous reinstatement, could nevertheless be brought back to consciousness with surprisingly few repetitions”; and, second (p. 394) that these associations “are active in some degree in the control of later mental operations of widely different character. . . . Much emphasis” Mr. Pillsbury adds, in explanation, “has been laid by Külpe and his pupils upon the purpose in mind . . . or upon the task that has been set . . . , in deciding which one of the many possible associates shall be actually effective in the control of consciousness.” His conclusion (p. 395) is that “reasoning, judgment, meaning, and belief go back for their explanation, not to bare physiological association, but to the dynamic controlling force of the entirety of experience.” It is thus evident that self,

or mind, is for Mr. Pillsbury synonymous with ‘experience as a whole’ or with ‘the entirety of experience’; and that he conceives this ‘whole’ as possessed of ‘controlling force,’ as ‘dynamic not static’ (p. 397).

At this point the self-psychologist is bound to turn upon Mr. Pillsbury with the retort of the little darky to his accuser: “All of dem t’ings you say I is, you am.” If the direct consciousness of self is to be set down as a vague imagining and a paper fabrication, what, pray, is to be said of the conception of consciousness as force? For either this is a mere restatement of the laws of association or else it illicitly implies that force is a sort of mythical entity. In any case, the conception of mind as force demands as its basis an exposition of the meaning of force; and this Mr. Pillsbury nowhere attempts. Besides being vague, this doctrine seems to me inconsistent with Mr. Pillsbury’s criticism and ineffective for his purpose. For the conception of mental states as a force (or as forces) is surely inconsistent with the mental-stream hypothesis, which Mr. Pillsbury assumes as established when he is criticising the doctrine of the self. And, in the second place, though a totality is a kind of unity it is not an identity, whereas identity of experience is that which Mr. Pillsbury started out to find.

I venture to point out, by way of conclusion, that Mr. Pillsbury, like many psychologists of his school, enjoys to the full one of the advantages offered him by the conventionality of language. I refer to his recurring use of personal pronouns. For example he says, that “we perceive an object as an object when we attach a meaning to it, and that consists in identifying it with . . . an earlier crystallization from experience. In the same way when we attempt to know our mental states as mental states we . . . refer them to other earlier developed crystallizations of experiences.” Would these sentences still retain a meaning if for ‘we’ one read ‘the dynamic entirety of experience’? The truth is, I think, that Professor Pillsbury, like all the rest of us (though without realizing it) ‘finds’ a self as the reality of which ‘mental state,’ ‘mental structure,’ and even ‘dynamic force of the entirety of experience’ are mere abstractions.

MARY WHITON CALKINS.

WELLESLEY COLLEGE.

BOOKS RECEIVED FROM DECEMBER 5, 1907,  
TO JANUARY 5, 1908.

*Vorlesungen zur Einführung in die experimentelle Pädagogik und ihre psychologischen Grundlagen.* E. MEUMANN. I. und II. Bande. Leipzig, Engelmann, 1907. Pp. xviii + 555 and viii + 467. M. 7 and 6.

*Introduction physiologique à l'étude de la Philosophie ; Conférences sur la physiologie du système nerveux de l'homme.* J. GRASSET. Pref. by M. BENOIST. Paris, Alcan, 1908 (for 1907). Pp. xi + 368. 5 fr.

*Le troisième Sexe. Les homosexuels de Berlin.* M. HIRSCHFELD. Paris, Rousset, 1908. Pp. 103. 2 fr.

*Traité pratique d'Hypnotisme et de Suggestion thérapeutique.* G. BONNET. 2<sup>e</sup> ed. Paris, Rousset, 1907. Pp. 328. 3 fr. 50.

*Report of the Commissioner of Education for the Year ending June, 1906.* Vol. I. Washington, Gov. Print. Office, 1907. Pp. xlvii + 643.

*The Creek Indians of Taskigi Town.* F. G. SPECK. Mem. Amer. Anthropol. Ass., II., 2. Lancaster, Pa., New Era Co., 1907. Pp. 164.

*Weather Words of Polynesia.* W. CHURCHILL. The same. Pp. 99.

NOTES AND NEWS.

A WORK on *Valuation: its Nature and Laws*, by Professor W. M. Urban, of Trinity College, Hartford, is to be published at once by Swan, Sonnenschein & Co., London, in Professor Muirhead's 'Library of Philosophy.'

THE preliminary announcement of the Third International Congress for Philosophy, to be held at Heidelberg, September 1-5, 1908, has been issued (Windelband, president; Elsenhans, secretary, Heidelberg). The International Congress for the History of Science will be held in connection with that for Philosophy.

THE third annual meeting of the Southern Society for Philosophy and Psychology will be held in Washington, D. C., February 25-27, at the time of the session of the Department of Superintendence of the National Educational Association. The officers of the Southern Society for this meeting are: Professor J. Mark Baldwin (Johns Hopkins), president; Professor Edward A. Pace (Catholic U. of America), vice-president; Professor Edward F. Buchner (Alabama), secretary-treasurer. Messrs. R. P. Halleck, J. M. Sterrett, A. C. Ellis, W. T. Harris, and D. B. Purinton are announced as additional members of the Council.

AT the recent meeting of the American Psychological Association the following officers were elected for the ensuing year: Professor George M. Stratton (Johns Hopkins), president; Professor A. H. Pierce (Smith), secretary. The report of the proceedings at the Chicago meeting will appear in our next issue.

THE following are taken from the press:

DR. CHARLES E. CORY is in charge of the department of philosophy in Washington University, St. Louis, in place of Professor A. O. Lovejoy, who is absent on leave during the year 1907-8.

DR. GEORGE T. LADD, emeritus professor of philosophy in Yale University, has returned from Japan to his home in New Haven.

PROFESSOR E. B. TITCHENER, of Cornell University, has been appointed non-resident lecturer on psychology at Columbia University for the present academic year.

IT IS announced that the German railroads have ordered that the vision of their employees must be tested henceforth with the colored plates devised by Professor W. Nagel, of Berlin, in place of the Holmgren yarns.

Vol. V. No. 2.

February 15, 1908.

THE

# PSYCHOLOGICAL BULLETIN

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PROCEEDINGS OF THE SIXTEENTH ANNUAL MEETING OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION, CHICAGO, DECEMBER 31, 1907, AND JANUARY 1 AND 2, 1908.

REPORT OF THE SECRETARY.

The sixteenth annual meeting of the American Psychological Association was held at the University of Chicago, on Tuesday, Wednesday and Thursday, December 31, 1907, and January 1 and 2, 1908, in affiliation with the American Association for the Advancement of Science, the American Society of Naturalists and the Western Philosophical Association. The sessions were well attended, and, in spite of the enforced absence of some who had prepared papers for presentation, the proceedings were full of interest.

The sessions were held, for the most part, in the Law Building of the University. The Psychological Laboratory also served as an informal meeting place for the members of the association.

On Monday evening, December 30, a reception to the visiting societies was tendered by the President and Trustees of the University of Chicago.

On Tuesday morning, December 31, at 10 o'clock, the meeting was formally opened by the president, Mr. Marshall. After a brief preliminary business session, at which the nominations of the council for officers and new members were presented, and action taken which will be detailed below, the scientific program was entered on. The scientific proceedings are reported in the abstracts below.

On Tuesday afternoon and evening, the association held no sessions, the members attending, in the afternoon, the joint discussion before the American Society of Naturalists, on Coöperation in Biological Research, in which Psychology was represented by J. R.

Angell; and, in the evening, the annual dinner of the Naturalists and Affiliated Societies.

On Wednesday morning, January 1, was held a joint session with the Western Philosophical Association; the program consisted, first, of a discussion on the Relations of Ethics to Philosophy and Psychology, and second, of a symposium on Value.

The afternoon session of Wednesday was chiefly devoted to the Report of the Committee on Measurements, presented by the chairman, J. R. Angell. An abstract of the report is contained among the abstracts below.

The association adjourned at an early hour on this afternoon, to hear the address of Vice-president Elmer Brown of the American Association for the Advancement of Science before the Section of Education, on 'The Outlook for the Section of Education,' and also the address of President F. C. Sharp of the Western Philosophical Association, on 'The Problem of Objectivity in Ethics.'

On Wednesday evening was held the annual business meeting, after which the president gave his address on 'The Methods of the Naturalist and of the Psychologist.' This was followed by a joint smoker with the Western Philosophical Association at the Quadrangle Club, given by the Psychological and Philosophical departments of the University of Chicago.

Thursday, morning and afternoon, was devoted to the reading of papers and discussion.

The following business was transacted at the different sessions: At the preliminary business meeting on Tuesday morning, the council reported in the matter of two amendments to the constitution, which had been proposed at the 1906 meeting, and referred back to the council for consideration. The council recommended that the proposed amendment to Article IV., substituting two dollars in place of one dollar as the annual subscription, be laid on the table; and it was so voted by the association.

The council further recommended that the proposed amendment providing that 'by unanimous vote the council may drop any member who has not been engaged in the advancement of psychology for a period of five or more years' be likewise laid on the table. It was so voted.

At the session of Wednesday afternoon, it was voted that the Committee on Measurements be continued.

At the annual business meeting, held Wednesday evening, the following officers, nominated by the council, were elected: *President*

for 1908, Professor George M. Stratton, of the Johns Hopkins University; *Secretary and Treasurer*, to serve three years, Professor A. H. Pierce, of Smith College; for *Members of the Council to serve three years*, Professor Raymond Dodge, of Wesleyan University, and Professor R. S. Woodworth, of Columbia University.

On nomination by the council, the following candidates were elected to membership: Dr. Felix Arnold, New York City; Professor Thaddeus L. Bolton, University of Nebraska; Professor Burtis Burr Breese, University of Cincinnati; Professor Arthur Ernest Davies, Ohio State University; Professor June E. Downey, University of Wyoming; Dr. Grace Maxwell Fernald, Bryn Mawr College; Mr. Frank Nugent Freeman, Yale University; Dr. Francis M. Hamilton, New York Training School for Teachers; Professor Elmer E. Jones, Virginia State Normal School; Dr. Daniel P. Macmillan, Board of Education of Chicago; Dr. Howard D. Marsh, College of the City of New York; Dr. Elsie Murray, Vassar College; Professor Joseph Peterson, Brigham Young University; Professor William Carl Ruediger, George Washington University; Professor F. C. Sharp, University of Wisconsin; Professor Norman Smith, Princeton University; Professor George M. Whipple, University of Missouri; Dr. Mabel Clare Williams, Iowa State University.

On behalf of the council, the president presented the following report regarding the guardianship and utilization of the accumulated fund:

"In relation to the guardianship of the accumulated fund the council begs to report that in its opinion this fund, amounting to \$2,646.74, should be allowed to remain in the Union Dime Savings Institution of New York, to be drawn upon in future only by direction of the association at one of its annual meetings.

"It suggests however that the association give to the council authority to draw from the savings bank such part of the accumulated interest on this fund as may be found necessary to meet the necessary yearly expenditures of the association in case these are found to exceed its yearly income; no such drafts however to be made without the approval of three fourths of the members of the council.

"In relation to the utilization of this fund the council begs to report that it finds at present no special activity of the association which requires the expenditure of any money which might properly be drawn from this fund: and it therefore advises its maintenance as above till such time as the association shall formulate special work which would require its use in whole or in part."

It was voted that the above report be adopted and that the council be authorized to carry out the provisions thereof.

The assistant treasurer presented the treasurer's report, as given below. It was voted that this report be accepted and printed in the proceedings.

On recommendation by the council, the following amendment to the constitution was adopted by a majority vote: Making the present Article III. to be Article III., Section 1; and inserting the following as Section 2:

"In case of the death, disability or resignation of either of these officers, the council shall appoint a successor to serve until the next annual meeting of the association."

On the recommendation of the council that it be given power after consulting with other societies to select the place of the next annual meeting, it was voted that the matter of the place of the next annual meeting be referred to the council with power, and with instructions to decide as soon as possible and to report in the published Proceedings of this meeting.

(In accordance with this resolution, the council, at a meeting held in Chicago on January 2, 1908, voted that the next annual meeting be held in Baltimore, unless circumstances shall arise to make a change of plan desirable.)

It was voted that the association express its gratitude to the University of Chicago and to the departments of Philosophy and Psychology for their entertainment.

It was also voted to express the thanks of the association to the Quadrangle Club and to the departments of Philosophy and Psychology of the University of Chicago, for entertaining the association at a smoker.

It was voted that the Proceedings of this meeting be printed.

#### *REPORT OF THE TREASURER FOR 1907.*

##### DR.

|   |            |
|---|------------|
| To balance from 1906 meeting .....                | \$2,770.17 |
| Dues received from members.....                   | 200.27     |
| Interest from July 1, 1906, to July 1, 1907 ..... | 76.57      |
|   | <hr/>      |
|   | \$3,047.01 |

##### CR.

|                              |          |
|------------------------------|----------|
| Stationery and printing..... | \$101.00 |
| Clerical assistance.....     | 40.40    |
| Postage.....                 | 12.95    |

|   |            |            |
|---|------------|------------|
| Expenses of smoker at New York, 1906..... | 10.00      |            |
| Travelling expenses .....                 | 35.00      |            |
| Petty cash.....                           | 9.80       | 209.15     |
| Balance in Union Dime Savings Institution | \$2,646.74 |            |
| Balance in Fifth Avenue Bank.....         | 191.12     | 2,837.86   |
|   |            | \$3,047.01 |

Audited by the Council.

R. S. WOODWORTH,  
*Assistant Secretary and Treasurer.*

#### ABSTRACTS OF PAPERS.

*President's Address: The Methods of the Naturalist and Psychologist.* HENRY RUTGERS MARSHALL.

(This address has been published in full in the PSYCHOLOGICAL REVIEW, Vol. 15, p. 1, 1908.)

*Report of the Committee on Measurements.* J. R. ANGELL, Chairman.

After considerable unavoidable delay the committee was organized with the following membership: Angell, Judd, Pillsbury, Seashore and Woodworth. Professor Raymond Dodge was invited to coöperate upon certain motor tests of vision. Professor Yerkes was asked to undertake investigations on color stimuli for work with animals. Dr. Wells has coöperated with Professor Woodworth upon tests on association.

The committee offers its present report merely as provisional and indicative of progress. Owing to several causes, of which the delay in organization and the subsequent delay in securing apparatus are most important, a complete report is not ready in any of the fields of work entered upon. The committee expects to present a much more extended report at the meeting of the association a year hence.

The following subjects have been chosen for work: Measurement of the threshold for difference in color tone (Woodworth); Free and controlled association (Woodworth and Wells); Tests on color vision of animals (Yerkes); Discrimination of pitch (Seashore); Determination of auditory limen (Pillsbury); Tests on motor processes (Judd); Eye-movements as a general test of muscular and nervous fatigue (Dodge); Determination of ideational type (Angell).

The present degree of progress in each investigation was reported.

The committee asked for an extension of their term of office for one year, which was granted.

The committee earnestly requested that suggestions and criticisms

should be sent to the chairman of the committee, or preferably to the member conducting the investigation upon which such suggestion or criticism immediately bears. The committee especially desires the coöperation and assistance of persons engaged upon problems germane to these above mentioned. Full credit will be accorded to all such volunteer assistants.

*Discussion : The Relations of Ethics to Philosophy and Psychology.*

This discussion was held at a joint session with the Western Philosophical Association, and was followed by a closely related symposium on Value, the detailed account of which may be found in the Proceedings of the Western Philosophical Association. The remarks of the participants in the discussion were, in substance, as follows :

CHARLES H. JUDD. — This contribution to the discussion dealt only with the relation of psychology to ethics, leaving to others the treatment of the relation of philosophy to ethics.

The effort was made to show that the traditional introspective and purely descriptive forms of psychology contribute very little if anything to ethics. Thus the controversy between the libertarians and the determinists was very largely a controversy between those who believed in the certainty and completeness of introspective evidence and those who attempted to gain an objective view of the nature of human conduct. Again it was pointed out that the descriptive classification of mental processes into three, or even two great divisions is hopelessly confusing to any intelligent treatment of conduct.

A functional, genetic and social treatment of mental life is at once the most productive form of psychology and the essential psychological part of ethics. This statement was supported by reference to the current psychological view of the intimate relation between activity and what was formerly distinguished as pure cognition. It was further supported by reference to the recent development of psychological doctrines of such social institutions as language and religion.

Is it not true that ethics has maintained itself in the past as an independent discipline largely because psychology has not recognized its true sphere as a functional and genetic study of mental life? Is it not true that ethics now finds itself with the development of historical anthropology and institutional history on the one hand, and social psychology on the other, hard pressed for clear justification of its independence? Even with reference to the individual forms of behavior the development of what the Germans call Begabungslehre promises

to give us a new attitude in regard to personal responsibility. So that even the sphere of introspective psychology and personal ethics promises to be absorbed in a study of the natural history of behavior which is much more in keeping with present tendencies than any absolute and independent study of conduct and its canons.

E. H. LINDLEY.—We may not agree with Paulsen that every classification of the sciences is ultimately accidental and yet believe that boundaries are largely determined by the interests of the various guilds of scholars concerned. Each thinker tends to suffer the perspective illusion that the foreground is ample and inclusive and that the background regions remote from his interests are narrow and meager of content.

As a consequence of conflicting perspectives, and for other good reasons, as well, the sciences overlap and interpenetrate. They stand more nearly in a relation of coördinate mutualism than in the hierarchical order conceived by Comte.

One road to every science lies through philosophy. The reverse is also true. Philosophy as the critique of ultimate values, stands in peculiarly intimate relations to ethics and to psychology.

Psychology viewed as teleological is partly descriptive and partly normative. Ethics, while chiefly normative, is partly descriptive. Psychology deals with proximate norms. It evaluates *behavior*. Ethics deals with remoter consequences of behavior, with more ultimate norms. It evaluates *conduct*.

Although psychology has contributed most of the material which ethics judges, it can never contribute all. The physical and physiological conditions of conduct, no less than the economic and social conditions, levy tribute on other sciences.

Ethical truth has not all happened yet. The struggle for the most inclusive good will continue so long as men live. It will always involve the hazard of new fortunes. Thus the determination of ultimate values will wait on experience.

Philosophical principles must undergo modification and therefore ethical norms must change just as unwritten constitutions change — through the readjustments of principle to fact necessitated by unique situations. While held constantly in leash by the regulative categories of philosophy, ethics stands in special and imperative need, just now, of enrichment from hygienic and economic and social science.

G. M. STRATTON.—Writers on ethics are themselves very uncertain as to the proper aim and method of their work. With some, ethics is the critical, or scientific, attempt to determine by what princi-

ples man's conduct should be guided, what should be its ideal. With others the aim of ethics is very different from this; it is a purely descriptive science, an account of the various and successive conceptions of right or of obligation among men. A somewhat similar divergence of definition is found also in writers on logic and on æsthetics.

The relation of these sciences to philosophy and to psychology will appear quite different according to our own sympathies in such a conflict. If we incline to regard ethics, æsthetics, and logic as having only a descriptive, a reportorial office,—incapable of formulating any lasting principles of right and wrong in their fields,—then they appear as departments of psychology, and have that same general relation to philosophy which psychology is recognized to have; that is, their purpose is less fundamental than that of philosophy, more exclusively concerned with appearances, with direct experience, rather than with the underlying reality.

If we take the contrary view of ethics, æsthetics and logic, giving them a legislative purpose and not alone descriptive of actual fact, then they are felt to be more closely allied with philosophy, since one can hardly hope to determine the most general nature of right, of beauty, and of truth, without a philosophy. For the standards by which we appraise human effort are affected by our decision as to the deepest facts of human nature and man's relation to the whole.

It would seem to me well to preserve and keep before us the distinction between normative and descriptive sciences,—between sciences of actual fact and sciences of standards, of valuation, of critical appraisement; and to reserve the names 'ethics,' 'logic,' 'æsthetics,' for sciences of the latter quality. Yet this does not mean that these sciences need be entirely metaphysical, and should keep aloof from psychology; it means only that they have a peculiar aim that is not entirely psychological, and this aim should be recognized as dominant and their psychological interests as but ancillary. It seems premature to give up the hope of establishing canons of right, which is not the purpose of psychology at all. And on the other hand, there are many questions regarding action,—its rate, for example, and the exact sensations which precede or accompany it,—which are important for the psychology of conduct, but which have no visible importance for ethics.

It is by no means clear that the perfect fulfillment of psychology, —of genetic and functional psychology, even,—would of itself be the fulfillment of these other sciences in their wider and less agnostic

form. Such a complete psychology would lay bare the exact character of all our acts and would state completely their causal relations, but would not decide as to the final ideal of conduct, of enjoyment, or of thought. Psychology at its best could throw much light upon the means of accomplishing such ends as were adopted; and consequently the normative sciences should be intimate with psychology. But they cannot honorably resign in favor of psychology.

Since there are different kinds of work to be done, it would be unfortunate if their differences were concealed and not kept clear by our names. If anyone is interested in a piece of work which is primarily descriptive, is primarily concerned with actual and historic fact, then it would seem best so to designate it,—as, for example, the psychology of obligation, or of enjoyment, or of judgment, as the case may be,—reserving the terms ‘ethics,’ ‘aesthetics,’ ‘logic,’ for those studies where the establishment of fact is intended merely as preliminary and helpful to the establishment of standards of preference, of canons of right in a particular field, together with any subsidiary rules by which we may be guided to conform to such standards or canons.

#### *The Genesis of Rhythm.* MAX MEYER.

The term rhythm is not used here as meaning a mere repetition, a mere periodicity, but a grouping together of elements occurring at regular intervals so that one of a definite number of elements is stronger than the others, has an accent. It has usually been taken for granted that the ability to act and to perceive rhythmically is an endowment of the human race. Some psychologists have thought that this view is supported by the fact that animals do not possess rhythm and that rhythm is restricted to definite forms, the groups of 2, of 3, and of combinations of these. His own experimental experiences have led the present investigator to the conclusion that rhythm is nothing but an habitual form of nervous activity, which can be acquired like any other habit if the right methods are used in learning it. That animals do not possess rhythm seems to be due chiefly to the fact that their lives are governed by instinct rather than habit, so that they do not have sufficient opportunities for acquiring any one of the rhythm habits. Even human beings differ widely in their rhythm habits, although most of them acquire the 2 and 3 groups more or less effectively in early life. That rhythm is restricted to the groups of 2 and 3 elements is not true. Rhythm forms of 5 and 7 elements in the group can be acquired, provided proper, that is, economical methods of establishing the habit are

used. The experimental work now in progress at the University of Missouri has for its aim the discovery of the conditions to be fulfilled in order to have an individual acquire with the least expenditure of time a special rhythm habit which thus far he has not acquired accidentally.

*A Test of Musical Ability.* MAX MEYER.

Tests of pitch discrimination have often been labeled by psychologists tests of musical ability. This is unjustifiable, for pitch discrimination plays no rôle in musical perception. Stumpf has recommended his fusion experiments as a test of musical ability. These experiments, however, offer so many technical difficulties when applied to a class of average subjects, that they can hardly be used for this purpose. An easily applicable class test of musical ability is the following. A common chord in any of its three positions is played on a piano or organ, one of the three notes of the chord is then played in the bass, and the subjects are asked if the bass note can be regarded as a representative of the whole chord or not. Even those subjects who have never heard of a fundamental tone, or tonic, or key-note, soon grasp, after a few preliminary experiments, the significance of the question. This test was used in three classes of college students of a total membership of 71. The total number of judgments pronounced was 1,773. Of these 52 per cent. were Yes, 48 per cent. No. Maybe the average human being, in a doubtful case, will say Yes rather than No. The percentage of right judgments was 71, of wrong ones 29. This shows that the test is well applicable to an average class, since the extremes possible in individual cases are 50 per cent. and 100 per cent. of right answers. The table shows the distribution of the subjects according to the correctness of their answers, or, as we may say, according to their musical ability.

| Range of percentage, | 50-60 | 61-70 | 71-80 | 81-90 | 91-100 |
|----------------------|-------|-------|-------|-------|--------|
| Number of subjects,  | 17    | 18    | 16    | 12    | 8      |

Training seems to have but little influence on the outcome of the tests. Some subjects who had not as much musical training as would result from singing in a chorus for a few months, nevertheless gave 90 per cent. right answers. On the other hand, some subjects who had received regular instruction in piano or voice, were found to be in the lowest class when their musical ability was measured by the test above described.

Fifteen of these subjects were also the subjects of tests in proofreading and in arithmetic. The following correlations were found to exist between the three abilities mentioned.

|                               |      |
|-------------------------------|------|
| Arithmetic and proof-reading, | +.52 |
| Arithmetic and music,         | +.46 |
| Proof-reading and music,      | -.10 |

That the correlation between the ability to read proof and musical ability is negative, is not astonishing, since the one is a function of the visual, the other a function of the auditory sense.

*A Study in the Analysis of the Memory Consciousness for Familiar Sounds.* F. KUHLMANN.

Groups of familiar sounds were presented to the subjects by the graphophone. Detailed introspections were required of the subjects after different time intervals of days or weeks, on the manner of the recall of the sounds, the nature, order, and use of the different imagery and sensory processes that entered the recall process. They also in each case measured from memory the duration of the sound, by turning a key of a recording apparatus.

In the recall visual, verbal, and motor processes entered for the reinstatement of the auditory imagery in detail. Visual imagery preceded the auditory in fully half the instances, verbal processes in about a fourth, and motor imitation of pitch and quality or of rhythm preceded least frequently. The function in recall of these three differed. (1) Of the visual imagery itself three classes appeared that were used differently. (a) A rough and incomplete visual image of the thing associated with the sound, used merely to get the auditory as a whole or to start the auditory imagery. (b) A detailed visual image of the thing with the motions and changes that would be involved in producing the sound, and used to reinstate details of the auditory imagery, as well as to merely start it. (c) Visual imagery of arbitrary forms with detailed parts and motions—visual sound analogies—used almost entirely for the recall of auditory details. (2) The verbal processes preceding the auditory consisted of an auditory image of the name of the thing, or of an incipient naming without such an image. Because of its nature it could play no part in the recall of details of a sound. (3) Motor imitations of the sounds consisted of (a) vocal imitation of pitch and quality, and (b) of imitation of the rhythm, which might be vocal, but more usually involved other than the vocal muscles. The function of both was that of recalling auditory details. In by far the majority of instances recall of details of a sound was found impossible without this motor imitation, the two being all but inseparably united. In the estimation from memory of the duration of a sound the auditory image was quite absent as often as it was present, and when present was but rarely used in that esti-

mation. In its place the motor processes used in imitating the rhythm of the sound, and its pitch and quality in a lesser degree, were the basis for judging duration.

Compared with the visual imagery of meaningless forms or of pictures of familiar objects, the auditory imagery of familiar sounds is strikingly poorer, cannot be recalled in detail, is very much more dependent upon other processes for its recall, and probably involves a much higher degree of memory illusion.

*Voluntary Control of the Distance Location of the Visual Field.*

H. A. CARR.

The paper gave an account of four cases of voluntary control over the distance location of the visual field. With two subjects the volitional movements of the field were accompanied by changes in the distinctness and size of the images, by characteristic motor experiences within the bulb, by changes in the size of the pupil, and by appropriate lenticular adjustments. No eye movements occurred. With the other two cases, eye movements, lenticular adjustments, pupillary changes, kinæsthetic experiences within the bulb, and changes in the distinctness of the visual objects were not present during the voluntary illusion. The conclusion was advanced that the relative importance of the various criteria of depth is an individual variant; that the illusion was conditioned by lenticular adjustments in the one case, while some central factor was operative in the other.

*A Practical Illuminator and Its Utility in a Psychological Laboratory.* WALTER D. SCOTT.

The author described and demonstrated an instrument for measuring the illumination at any point in doors or out, and also the brightness of surfaces of any color, *e. g.*, colored papers, colored walls, etc. The apparatus is based on the principle of the flicker photometer, and consists of a dark box, in which is an incandescent electric light, carefully standardized, and run by a constant current. The light from this is reflected from a matt surface into the observer's eye, but is interrupted at intervals by means of a rotating half disk, which consists of a mirror, reflecting the light which it is desired to measure. The distance of the standard light is adjustable, and by this means the distance can be found at which the standard light ceases to flicker with the light to be measured. The author further showed the value of knowing the illumination of the room in which experiments are carried on, and the brightness of objects exposed in experiments. This factor has been neglected in recently published experiments, though such neglect was unjustifiable.

*Apparatus for Chronometric Experiments in Psychology.* JOHN A. BERGSTRÖM.

A brief description, illustrated by photographs and sketches, of a complete equipment for the usual chronometric experiments, including several new types of apparatus.

The equipment consists of (1) a large, three-rate pendulum chronoscope, a model of which was exhibited by the C. H. Stoelting Co., at the World's Fair in 1904; (2) small two-rate pendulum chronoscopes, which serve for all usual experiments and for practice work by students; (3) exposure apparatus for light, colors, printed words, and pictures; (4) key for touch stimulation; (5) key for sound stimulation; (6) magnet reaction key for usual reactions by the hand; and (7) speech keys for association experiments.

The small pendulum chronoscopes are easily portable.

*Cross-Breeding of Ideas as a Factor in Invention.* T. H. HAINES.

The central question of psychology is that of organization. The exploitation of imitation has explained much in ontogenetic organization as coming directly through social heredity. But the large question of social advance, and the consequent place of individual invention, is not thereby explained. It is necessary to study the method of the production of mental variations.

Plant and animal breeders facilitate the production of variants by hybridizing. Cross-breeding seems to be especially productive of variations. It seems to upset the equilibrium of organization in parent cells, and so afford opportunity for latent and obscure hereditary elements to come out.

So in the history of science we find it is the impact of dissimilar mental processes, ideas, upon each other which has prepared the way for the arising of productive theories. The scheme or plan is born of the puzzle or problem consciousness. And the problem consciousness is the product of a jarring impact.

Such action of jarring impacts is seen in (1) Darwin's conception of his great theory as he observed South American fossils, plants and animals, under the spell of Lyell's theory. (2) Darwin's reading 'Malthus on Population.' (3) The influence of Priestley's discovery upon Lavoisier. (4) The effect of the discoveries of the Paduan school of medicine on the mind of William Harvey. (5) The effect of the glacial theory of Charpentier and the observation of glacial action in the Alps on the mind of the paleontologist, Agassiz. And (6) the action of the findings of Mitscherlich with regard to paratartric acid on the mind of Louis Pasteur.

The impinging idea is productive of what we may call the *problem consciousness*. It is an awareness of something which is felt to be a possible organization of ideas and functions which the subject is as yet unable to bring clearly into experience. It is also a definition of a want impelling to its own fulfillment. It is thus both schematic cognition and an impelling force driving on to the full realization of the schema.

Herein lies a most important gauge of mental ability and social efficiency. It is partly what is ordinarily connoted by 'scope of attention.' But in addition to this it is also what we may call *demand for the integrity of experience*.

*Function and Feeling.* R. S. WOODWORTH.

While the localization of brain functions is a physiological task, the determination of what functions there are to be localized is the work of psychology; and so far, psychology has made little progress in this work. Memory, imagination, judgment, reasoning, attention and inhibition, will, are probably general functions or properties of all mental operations, and not localized in special parts of the brain. We ought to be able to analyze mental function according to the subject-matter, and according to the common elements in subject-matter which is at first sight diverse. The methods by which such analysis could be reached, in addition to the study of pathological cases, include: the study of individual differences of a marked sort, the correlation of efficiency in different kinds of subject-matter, the influence of training in one sort of material on efficiency in other sorts, and, possibly, introspection. This last brings up the question how far consciousness corresponds to function—a question which cannot be answered from present knowledge. The view that consciousness attends only the sensory functions is, I believe, contradicted by introspection and by pathology. The view that consciousness attends only the less practiced functions is incompatible with the persistence of sensory consciousness in spite of the enormous amount of practice which those functions receive. The view that consciousness attends only those functions which discharge readily into motor pathways loses sight of the cases of intense feeling with obstructed reaction, and also of the markedly *non-motor tendency* of intellectual activities. Though it is hard to gainsay that every brain activity has an immediate motor result, it is easy enough to show that the motor outflow is often accidental and irrelevant. The absence of direct and appropriate motor response is an essential condition of thinking. Thought, as a

function, is not a motor reaction, but a central reaction or adjustment. Psychology is more essentially a study of function or behavior than a study of feeling; but it would be an extravagant waste to limit the study to motor behavior, leaving out of account the introspective evidences of function.

I would propose as a hypothesis, reasonable enough in appearance and not contradicted by known facts, that each cortical function has its own peculiar feeling, and that the momentary predominance of one feeling over another—its 'clearness'—is after all a matter of intensity, the most active function at the moment occupying the attention.

*Paradoxical Fatigue Phenomena in certain Depressions.* FREDERIC LYMAN WELLS.

In normal individuals the speed of repeated tapping (as studied by Dresslar, Bryan, Gilbert, etc.) decreases with considerable regularity for the first 30 seconds, after the first second; in cases of manic-depressive depression, however, an extended warming up process is often noted during this period. The tapping rate may increase only for the first five or ten seconds, and then be over-balanced by fatigue, or it may increase through the entire 30 seconds, giving a curve exactly the reverse of the normal. This seems to be a phase of the general susceptibility to 'keying up' influences clinically observed in such cases (*e. g.*, brightening up in the afternoon, or under loss of sleep, etc.), and together with them indicates that the general lowering of psychic tone in these depressions is probably associated with increased sensations rather than conditions of fatigue.

*Reactions and Perceptions.* JAMES McKEEN CATTELL.

It was argued that perceptions are distinguished from images by the greater prominence of the conative or motor elements. The way we react is as much a part of the psychophysical process as the kind of stimulation, and the motor elements are as integral a part of the perception as the strictly sensory elements. Images and ideas are less likely to be followed by definite movements. The nervous system is so organized that we react to objects, and the more prominent motor elements give superior vividness and reality to perceptions, which enable us under ordinary circumstances to distinguish them from images. Our reactions, as a rule, work and are useful, giving rise to new perceptions, which also work, and thus the material world becomes real for us. Images and perceptions are confused,—we have hallucinations and illusions,—when the motor reactions are

inhibited or are excessive. Thus in sleep, in reverie, in some forms of hypnotism, intoxication and insanity the motor reactions are lacking or indefinite and we have dreams, visions and hallucinations. On the other hand, objects and images are confused when the motor reactions are excessive or unnatural. We cannot separate images from perceptions. Images are revivals of past sensations, and perceptions are mainly supplied by conditions of the central nervous system. Images and perceptions are equally the result of brain changes, which are themselves part of the world's material system. But the brain changes which are excited from within are less likely to result in motor discharges than those which form parts of sensorimotor arcs. This is necessary if the organism is to survive and prosper. The more pronounced motor elements of the sensorimotor arcs are represented by superior vividness in perceptions as compared with images, and this appears to be at least one of the factors enabling us to construct the world in which we live.

*A Case of Experimental Nerve-Division in Man.* W. H. R.  
RIVERS.

The experiment reported was done in collaboration with Dr. Head, who, in order to follow thoroughly the process of recovery of sensation during the regeneration of a nerve, had the radial and external cutaneous nerves of his left arm cut and reunited. During the five years succeeding this operation, as well as before it, the state of the sensibility has been carefully tested. The principal result has been to show the existence of three kinds of sensibility in the parts affected. There is first of all a deep or subcutaneous sensibility, which was not destroyed by the operation; it remained sensitive to pressure and painful stimulation, but not to heat or cold; it gave perfect localization, but no power of spatial discrimination as tested by the compasses, and no power to perceive the shape of objects. This was the only form of sensibility present for some months, after which another form began to return. The skin now became sensitive to prick which was extremely uncomfortable and evoked reflex withdrawal of the hand and cries. Sensitivity to pronounced heat (above 40° C.) and cold (below 26° C.) also returned at this stage, and the hairs gave peculiar tactile sensations in addition to the pain produced when they were pulled. Hot spots and cold spots were sharply defined, and in fact were the same as before the operation. Pain was somewhat less markedly punctiform in distribution. There was however no power of localization (if the subcutaneous sensibility was excluded); the sensations

aroused were diffuse, and sometimes 'referred' to distant parts. Spatial discrimination was still absent, also the power of distinguishing intermediate degrees of heat or of cold. In short, at this stage the sensory function was crude, a warning mechanism with strong reflex tendencies, but not permitting of exact perception of objects. The kind of sensibility so revealed was called by the name 'protopathic.'

Many months later there appeared, creeping down the arm from the point of injury, a third sort of sensibility, which included sensitiveness, without pain, to light touches, such as that of cotton-wool, and to slight degrees of coolness and warmth. The irradiation and reference of sensation disappeared at once; localization, discrimination of the two points of the compasses and of different degrees of heat and cold appeared. The distribution of this form of sensibility was not punctiform. This highest form was given the name 'epicritic.' It was found that cooling the hand after it had reached the epicritic stage would put it back into the protopathic stage. It does not appear that the epicritic stage is simply an intellectual development on the basis of the protopathic stage; for in one small area of the arm, and also in clinical cases observed by Dr. Head, the epicritic sensibility returned without the protopathic ever appearing. It is probable that the two are different senses, with separate systems of nerve fibers.

#### *The Influence of Small Doses of Alcohol on Muscular Activity.* W. H. R. RIVERS.

Kraepelin's modified ergograph was used in testing the amount of work which could be done immediately after the ingestion of a small quantity of alcohol as compared with the work that could be done on other occasions when no alcohol was administered. The conditions of the experiments, the mode of life of the subject, were kept perfectly uniform. In order to avoid any purely mental influence, due to the subject's greater interest in the experiment when alcohol was administered, he was kept in ignorance as to when he received it and when he received a neutral liquid, both being disguised so that they could not be discriminated. Under such conditions it was found that small doses of alcohol produced no effect whatever on the ergographic record. If however the disguise was removed, so that the subject knew when the alcohol was administered, the (apparent) effect of the alcohol was to increase the muscular activity. The results of previous observers, showing a stimulating effect of small doses on muscular activity, are therefore to be explained by the purely sensory effect of the alcohol on the mucous membrane or by the mental factor.

*Man, Woman, and Habit: The Conclusion Havelock Ellis Missed.*  
H. AUSTIN AIKINS.

At the conclusion of an earlier edition of *Man and Woman* Ellis says that woman is 'more primitive' than man; but does not explain what that means. In his last edition he omits this phrase and gives instead some half-dozen main points of difference between the two sexes.

My point is that all these points of difference can be explained as different aspects of this one difference: *Men have a greater tendency than women to form habits and to use them*, to build them together, and to build one on another, to reconstruct the personality on a basis of habit. This principle explains some facts that Ellis mentions but can't explain (*e. g.*, that woman's greater sensibility to immediate impressions does not hold of smell and taste as it does of sight).

Ellis can't tell whether his half-dozen general points of difference are native or acquired; but I can. For a greater or less tendency on the part of either sex to respond by habit to experience cannot possibly be a result of experience but only of natural selection. The difference between the two is therefore a true secondary sexual characteristic.

The possibility of fitting all or nearly all of Ellis's 'facts' together under one general principle tends to strengthen the 'facts' themselves, even though many of them be based upon mere general impressions.

A conclusion as broad as mine cannot be upset by the skull measurements cited to disprove Ellis's 'greater variability of the male' or by any other single set of comparisons in a very restricted sphere.

If my conclusion is correct, it tends to strengthen the evidential value of general impressions.

*Group Self-Consciousness: A Stage in the Evolution of Mind.*  
F. C. FRENCH.

Between the merely objective consciousness characteristic of the lower animals and the individual self-consciousness that we find in ourselves there is another type of mentality which may be called group-consciousness, or more explicitly group self-consciousness. Man's fundamental personal conception is an 'our' or 'we' in which 'I' and 'my' are included but not distinguished. Evidence for the view that primitive man thought predominantly of the group-self rather than of the individual self is found in certain facts of language, in the universal submission of savages to tribal custom at the expense of all individual freedom, in the early conception of responsibility for crime as tribal rather than individual, in the communal holding of property, and

in the fact that religion is originally a tribal interest of which we find numerous survivals in later times, as, *e. g.*, in the civic religions of Greece and Rome.

The mob-mind and other forms of the crowd psychosis with which we are familiar to-day are survivals of, or atavistic returns to the group self-consciousness which was the predominant mental attitude of primitive man.

If this view is accepted it has an important bearing on the problem of moral evolution. However many biologically and socially useful modes of conduct may be brought about by instinct, custom, law and religion, morality as such is self-imposed conduct. It must, therefore, involve self-determination, self-judgment, and is possible only in a being who has attained to individual self-consciousness. The moral-consciousness, then, is not to be looked for in animals, or even in primitive man, but only after a considerably individualized stage of human development has been reached.

*Intelligence and Imitation in Birds; a Criterion of Imitation.*

JAMES P. PORTER.

*Some Facts Regarding the Behavior of Noddy and Sooty Terns.*

JOHN B. WATSON.

A large colony of noddy and sooty terns goes annually for the nesting season to Bird Key, a small coral island belonging to the Dry Tortugas group. During the past year (1907), this colony contained approximately 1,400 noddies and 20,000 sooties.

The feeding and nesting habits of the birds were carefully studied during the various stages of the nesting season. Their instinctive reactions were found to differ markedly during the periods of (*a*) laying (mating, construction of nest, etc.), (*b*) of brooding (26 days for sooty, 35 days for noddy) and (*c*) of rearing the young.

It was found that the reactions of the adults in the wild state could be controlled by using the nest (and nest environment) as a stimulus — the birds will overcome difficulties and will remove obstructions in order to reach the egg. In experimenting upon the nests, it was found that the birds displayed a wonderful ability to orient themselves with respect to the exact position of the nest locality. Some tests were made in order to determine the accuracy of the birds' adjustments to their nests. The slightest lateral displacements of the nest disturb their reactions to a marked degree, while vertical displacements, on the other hand, do not disturb their adjustments in nearly so serious a way.

These terns possess in a high degree the function of orienting themselves from a distance. Birds individually marked were sent to Key West (65.8 statute miles), to Havana (106 statute miles) and to Cape Hatteras (along-shore route, 1,081 miles). All the birds returned from Key West and Havana, while three out of the five sent to Hatteras returned (the other two possibly may have returned). The farthest distance to which these birds go for food had previously been determined to be about 14 knots. It is extremely difficult to understand how these birds could have established visual associations extending over so wide a territory as the above. This is especially true with reference to Cape Hatteras, since it is far beyond the range of distribution of these tropical birds.

The young of both species were reared by hand. The genesis of instinctive reactions was studied in detail. Interesting confirmation of Lloyd Morgan's statements was obtained, with respect (1) to the lack of fear in young birds when reared by hand, (2) to the effect that discrimination (of food stuffs, etc.) is not a native reaction but an acquired one.

When the birds were sufficiently mature, they were required to learn Porter's simple maze. A difference in the learning process between the two species was found to exist. This difference was found to be entirely in line with the differences observed in the behavior of the adults of the two species.

## PSYCHOLOGICAL LITERATURE.

### ATTENTION.

*L'attention spontanée et volontaire.* EDOUARD RÖHRICH. Paris, 1907. Pp. 174.

In his monograph on attention M. Roehrlich treats the subject under the general topics of (1) primitive or spontaneous attention, (2) apperceptive attention and (3) voluntary attention. Each of these in turn is discussed under the general headings of the psychology, the laws and the practical application of attention.

The author finds that primitive or spontaneous attention in the past has been neglected by psychologists of whom he quotes a number of examples. It is this primitive attention which he wishes to emphasize. Primitive attention is such as is excited by the shock of an impression from without (p. 20). A number of examples from the psychological laboratory are brought forward to show the peripheral and external causes of such attention. Thus the fluctuation of attention, the visual adjustments excited by spacial relations and the various optical illusions are in part due to external stimulation.

In practical life primitive attention plays an important part. It is so combined with other elements however that laboratory experimentation is necessary before it can be clearly defined and selected from the complex processes in practical adjustments. Spontaneous attention is excited by an external object which results in organic and peripheral tensions. Further interpretation of the exciting cause then becomes possible (p. 54). Thus the report of a cannon startles one and excites attention. Further action then follows. Once attention is aroused by the object which breaks violently into consciousness there may follow closer investigation, interpretation and analysis. These later stages of interpretation and judgment are not a part of the original spontaneous attention. Men often make use of the startling nature of situations to attract the attention of others. Thus placards with large letters, colored pictures, loud cries, etc., attract us. Children especially are appealed to by these means (p. 59). In its early stages education makes use of primitive attention. Art, too, recognizes its value. Combinations of colors, arrangements of form, musical rhythm and harmony show an instinctive appreciation of the laws of spontaneous attention.

Of the laws of primitive or spontaneous attention we have the following: (1) The degree of primitive attention depends not on the intensity of the stimulus but upon its vividness. In this connection vividness is independent of intensity. The more vivid an impression is, the greater is its exciting power. The more intense an impression is, the more does it tend to deaden consciousness (p. 63).

(2) That external stimulation may result in primitive attention further interpretation of the stimulus must follow (p. 64).

(3) The time between the impression and the following interpretation or reaction is longer if the excitation is unexpected (p. 64).

(4) If succeeding impressions are too close together or too far apart, judgment and interpretation become more difficult or even impossible (p. 64).

(5) An object cannot be fixated more than a few seconds at a time (p. 65). In this connection see James, *Principles of Psychology*, I., 420.

(6) When primitive attention is simultaneously excited by a number of stimuli the following results are possible:

(a) If the stimuli are different in quality and independent of one another, judgment and interpretation are weakened.

(b) If the stimuli are different in quality but bound together in some common object, judgment gains in precision.

(c) If a number of objects or groups of objects excite attention, four or five may be dealt with at once with equal precision.

(d) If the stimuli are capable of fusion as are sounds or colors, the individual concerned may perceive new and supplementary impressions in addition to the original stimuli. This happens in the case of first and second difference-tones (p. 66).

These laws give rise to the following maxims or rules (p. 66):

(1) To hold primitive attention the impressions should be graded in intensity and vividness (p. 67).

(2) To excite and sustain primitive attention each impression should be separate and distinct so that it forms a whole and so that it may be properly assimilated by the individual attending to it (p. 68).

(3) When many impressions follow one another a proper time must elapse between them. If the time is too short the resulting perplexity and confusion are followed by bad judgment or by none at all (p. 69).

(4) To stimulate primitive attention one must use impressions of a different quality provided they belong to the same object (p. 70).

(5) To arouse and sustain primitive attention one must properly educate the senses (p. 71).

After treating of primitive attention M. Rœhrich takes up apperceptive attention. This kind of attention exists when the impression coming from without excites mental ideation and is assimilated or apperceived by images, ideal or mental complexes or groups. Thus an astronomer will see a new star at once because of the masses of images and ideas which he has of the stars and of the heavens. So too a shepherd will at once notice the gap made by a missing member of his flock (p. 73). Apperception in this case refers to the mental assimilation of the new impression (p. 75). Feeling has little to do with the matter. If feeling is excited it tends to interfere with the intellectual processes. In fact a strong feeling of fear may result in an effort to get away from the object (p. 77). Curiosity however is productive of apperceptive attention.

The mechanism of apperceptive attention is somewhat as follows:

- (1) There is present a mental background of ideal complexes and groups more or less connected.
- (2) The shock of an impression brings into prominence one or more of these mental groups.
- (3) There results a tension in the form of curiosity, expectation, interest.
- (4) Finally the new impression is absorbed by the ideal masses already existing (p. 80).

In practical life the orator, the playwright, the pedagogue, the politician and the writer recognize apperceptive attention. The orator will first rouse common sentiments and will appeal to popular beliefs before introducing his new ideas. The dramatist will center his play about some old theme or hero. The teacher will seek to rouse what is known in the child's mind and connect it with the new matter which he has on hand. The politician must regard the wishes and ideas of his constituents. Modern writers of novels refrain from preaching directly. They present the facts in an attractive manner, give the story and allow the reader to interpret it and give it point and application.

The one law of apperceptive attention is this. In every act of consciousness not directed by the will the accuracy and the rapidity of consciousness depend upon the extent, the variety and the proper coördination of the associated ideas. From this we get the following rules and maxims:

- (1) To ensure apperception one does not have to present a new notion so long as it seems to be new (p. 104).
- (2) To facilitate apperception one must present an idea similar though not identical with the old ideas (p. 105).

(3) The new idea should be connected with the old by a series of graded and progressive steps (p. 107).

(4) Between two states of apperceptive attention there should be a sufficient time to allow of proper assimilation (p. 109).

The third part of the book is devoted to voluntary attention. This form of attention is distinguished from the other forms in that it has (1) anticipation of an end, (2) choice and (3) conscious effort (p. 119). Anticipation of an end is more or less indefinite. A number of ends may be presented for selection. Choice of one in preference to the others is made. Effort is felt in the realization or in the attempted realization of the end. In positive effort an endeavor is made to act and do something. In negative effort such activity is withheld and inhibited. As a whole, in all its forms, attention may be considered as a state of mental tension which may vary from simple innervation to effort and from effort to active volition (p. 160).

The author concludes his excellent work with certain minor questions, as the relation of voluntary attention to memory, to apperception, to observation, etc.

The work of M. Roehrich is extremely valuable for the many practical suggestions which he embodies in it. He should have paid more attention to English and American psychologists, as Stout, McDougall, Titchener, Baldwin, Sanford, Ladd, Dewey, to name only a few. The motor side of attention would then have probably received a fuller treatment. This however is simply a possible correction *in extenso* and does not affect the work as far as it is given. It is of note that this monograph on attention received the Prix Sain-tour, 1905, by the *Academy of Political and Moral Sciences*.

FELIX ARNOLD.

NEW YORK CITY.

*Fluctuations of Attention to Cutaneous Stimuli.* L. R. GEISLER.

Amer. Jour. of Psychol., 1907, XVIII., 309-321.

Because of the lack of agreement in the results of previous investigators the author was led to take up these investigations upon the fluctuations of attention. At first he undertook to repeat as far as possible the experiments of Wiersma who came to the conclusion that the fluctuation of the attention was proportional to the intensity of the stimulus and then he turned to Ferree who had concluded that no fluctuations were experienced. In following Wiersma's experiments two sets of observations were taken under the same external conditions. In the first Wiersma's series of weights were used. The liminal, which

was 7.4 grams, did not prove to be the liminal for Geisler's reagents. In the second set of experiments a lower series was used and slight changes in time and area stimulated were made. At the end of each trial the reagent wrote out an 'introspective account of the course and content of consciousness.' The results here obtained were opposed to those of Wiersma. No fluctuations were perceived. The author concludes that both liminal and subliminal area stimuli applied to the skin change their character and tend to disappear after the lapse of several minutes and the attention experiences no kind of fluctuations for at least two or three minutes. In attempting to repeat Ferree's experiments with electro-cutaneous stimulation he experienced some difficulty in eliminating touch, pressure and taste sensations. By making use of cocaine he obtained results that accord with those of Ferree. The final conclusion of his experiments was that under favorable conditions attention focused upon liminal and subliminal sensations remains approximately constant for at least two or three minutes and then it gradually fades out in consequence of adaptation.

*Attention Fatigue and the Concept of Infinity.* ROWLAND HAYNES. *Jour. of Philos.*, 1907, IV., 601-606.

The purpose of the paper is to suggest a relation between 'diffusion of attention as one element in intellectual fatigue and the metaphysical concept of infinity.' There are two kinds of concepts, 'content-images and word-images.' Content-images are used for all but the most formal reasoning. Content images are necessary for such a discussion as that of infinity. After citing many examples of images called forth by such words as space, he finds that each of these images involves 'an undifferentiated something which induces smothering of attention.' Since the smothering of attention is always an element in the concept of infinity, it is the essential element of that concept. Three suggestions grow out of the above theory. When the organism is fatigued by overwork or excitement, smothering of attention is very easy. This is the case in those mystic states in which 'oneness with the Infinite figures so largely.' The knowledge of the infinite is impossible, because knowledge involves 'the fluttering of attention over the different features of any given percept.' A relation may be established between the concept of infinity and attention fatigue which will bring us nearer to finding a physiological basis for metaphysical concepts.

Alice M. Batty.

UNIVERSITY OF NEBRASKA.

## MEMORY.

*Effect of Changes in the Time Variables in Memorizing, Together with some Discussion of the Technique of Memory Experimentation.* JOHN A. BERGSTRÖM. Amer. Journ. Psych., 1907, XVIII., 206-238.

This paper is divided into seven sections. In the first the writer points out the psychological and pedagogical meanings of the problem of the effect of altering the various time factors in memorizing. He also notes that the study is complicated by the fact that although exposure-times and intervals between members of series can be accurately limited and although the pulses of 'conscious attention' can be made fairly parallel to the objective series of impressions, yet the nervous processes involved cannot be thus severed and may perhaps overlap. The second section contains a brief account of the methods of procedure thus far employed in memory investigations. The writer supplies for *Erlernungsmethode* and *Treffermethode* the happy English equivalents of 'method of complete memorizing' and 'method of right associates.' The third section deals with experimental technique, and describes a noteworthy compound interrupter and exposure-drum designed by the writer. The most signal advantage of this apparatus is that it makes easy the independent and measurable variation of the three time-factors in memorizing series, namely, the exposure-time of the members, the intervals between exposures, and the interval between presentations of the series as a whole.

The fourth section describes a series of experiments made in 1895 by Superintendent Sanders in coöperation with the writer. The method used was a form of the method of retained members (*Methode der erhaltenen Glieder*) to which the writer does not apply any particular name. The presentation was oral. The experiments were not extensive but would seem to indicate that 'the acquisition and retention of a series of associative words varies approximately as the logarithm of the interval at which the words are spoken, the shortest interval being that which barely permits a clear pronunciation.' The intervals compared were 0.5, 2 and 3 seconds. The learning of series of letters in accidental order proved much less dependent upon the interval between the members. Supplementary experiments tended to show that 'dysassociable' words stand half way between letters and easily associative words in their dependence upon this interval. The fifth section reports work done in 1903-1904 with the apparatus mentioned above, by Superintendent Herrington, also in coöperation with the writer. This work included three sets of experiments, with series

of syllables, one set for each of the three time-variables. (1) Variation of the exposure-time had little effect on the results. The times tested were 41, 82, 164 and 3.18<sup>7</sup>. The second was most agreeable to the subjects. (2) Increasing the intervals between syllables decreased the number of omissions and wrong insertions, but increased the number (relatively very small) of mistakes in order. (3) Increasing the interval between presentations of the series decreased the number of errors.

The sixth section of the paper describes the work with time-variables of Miss T. L. Smith, Ebbinghaus, Jost, Miss Lottie Steffens, Ogden, Fr. Ephrussi and Reuther. The seventh section furnishes the writer's own construction of all the data in hand. Alteration of the time variables certainly affects 'the reception and association of the impression,' that is, 'the amount of apperceptive apprehension of the material and its connections.' However, the increase of difficulty in memorizing with decrease in the intervals may well be due in part to the repressing of motor reaction to the series-members and in part to the cutting short, by the reception of a new impression, 'of a more or less unconscious organizing process continuing some time after the impression has been received and necessary for its permanence and revivability.'

In the opinion of the reviewer, the writer has not taken sufficient pains to bring out his points succinctly but has made the text of this valuable paper unnecessarily hard reading.

E. A. McC. GAMBLE.

WELLESLEY COLLEGE.

*Problems in the Analysis of the Memory Consciousness.* F. KUHLMANN. Journ. Philos., Psychol. and Scient. Methods, 1907, IV., 5-13.

Mr. Kuhlmann in stating the main problem now at issue in the analysis of the memory consciousness lays stress upon the presence in memory of organic factors. The discovery, he says, of such organic factors in recognition has caused a wide divergence from the view of memory as made up of special sense-images. There arises, however, the fundamental question whether these organic factors are 'organic images' or 'actual organic sensations' — a question whose answer involves the building up of a psychology of organic sensations. If this question were answered, we should have left the purely analytical problem of the relation, in general, of organic images to special sense-images in emotional and perceptive memory of their function

as mediating, concomitant or inhibitive factors in recall; and of their aid in recognition to judgment of the correctness of special sense-images. Much light may be thrown upon the analysis of the memory consciousness by work along these lines supplemented by introspective study of the nature and causes of memory illusion.

ANNE L. CRAWFORD.

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## DISCUSSION AND CORRESPONDENCE.

### THE EGO AND EMPIRICAL PSYCHOLOGY—A REPLY.

Apparently the art of successful polemic lies in assigning to your opponent an indefensible position and then massing your guns on its vulnerable points. I had no intention of making use of these tactics in the remarks to which Professor Calkins takes exception in the January number of the *BULLETIN*, and in fact had no one specifically in mind in connection with many of the phrases that she cites. All criticisms are, like universal judgments, the apodoses of understood hypotheses, and if Miss Calkins is not among those who use the self-psychology as a fourth dimension in which they may take refuge when some cherished opinion is too closely pressed by recognized fact and mundane logic, my remarks of course do not apply.

In my turn I should like permission to disclaim certain of the theories that she lays at my door. In particular I did not base any of my argument upon the assumption of the passive stream of consciousness, which I am quite as much concerned as she to show is a pure abstraction. In fact she entirely omits to mention the facts and arguments that I make use of in the article, and I would ask the reader if interested to look to the original for an outline of the argument rather than to her summary. My starting point is the same as my critic's, the mental content as immediately experienced. Our ways diverge only in that I believe that both mental content and self are abstractions that have existence only in so far as they can be made to explain experienced fact. I was concerned only with the abstract self in the paper in question and that I tried to show is not suited to explain the facts that it was devised to explain. I turn then to immediate experience and endeavor to show that the functions that are usually assigned to the self can be derived from known aspects of the immediately given. But I repeatedly state that that given is active not passive, concrete not abstract.

I am not sure that I have any deep-seated objection to the tag of

'structuralist,' but I have been wondering since reading Professor Calkins' discussion which of us is the structuralist and which the functionalist. In reference to the will, for example, my critic appeals from the admitted facts of structure to find will not in function but in a concrete feeling, and that can be nothing but a structure. She finds evidence for the self, again, not in function, but in direct consciousness, at the most but new form of content. Even force, which I use most innocently to designate an observed function, she can understand only as a mysterious structure on the same level with her 'self.' Both will and self I would class as functions. Will is the function of masses of experience, in part immediately present, in part more or less remote, so far as they are active in the control of action. In the same way I would define self as the function of all that we are, active in the interpretation of new experiences and in taking them up into the persistent unity of experience. Force exerted by early or recent experience seems to me to correspond to an immediately observed fact, and to be at once distinct from the associative process, though related to it and to be function, not structure. Indeed, I cannot see that force in any use of the term, physical or metaphorical, could be a structure. I of course have no time here to discuss the point as to how it differs from association, but can only refer to my forthcoming volume on Attention.<sup>1</sup> In fact, it seems to me that Miss Calkins is inclined in general to make a function stand alone unrelated to any structure and so to make it a slightly different sort of structure, not a real function as I understand it. In the only conceivable view of the matter the figure of function and structure can be applied only if it is assumed that structure and function are inseparable. It is certainly possible that one may be known better than the other. This is the case at present with meaning, where the function is matter of universal agreement, while the structure is relatively unknown, or at least in dispute. But an instance of this kind merely compels us to confess ignorance as to what the structure may be, not to deny its existence. I make these remarks with no desire to seem to instruct the champion of functionalism but to save myself from further misunderstanding.

As for the argument from the use of the personal pronouns, that it seems to me is of a piece with an attempt to prove the ptolemaic astronomy from the currency of the word 'sunset.' 'I' means for me one function of experience as a whole, and I cannot see why it should be monopolized by any (structural?) abstraction from that whole. As I understand it, the facts of the case are not in dispute between us; it

<sup>1</sup> Published by Sonnenschein, London.

is merely the interpretation of the facts. The pronoun refers to the fact, not the theory.

W. B. PILLSBURY.

UNIVERSITY OF MICHIGAN.

### A CASE OF ANIMAL ADOPTION.

The following personal letter reports an incident of interest to comparative psychologists. The date of the letter is explained in the writer's postscript.

J. MARK BALDWIN.

PALO ALTO, California,

March 5, 1903.

*Dear Sir:*

I do not know whether you will be interested in the case of 'adoption' that has come under my notice recently, but my interest in it was greatly increased by the reading of Groos on the Play of Animals at the time the incident happened.

One of a herd of eleven cows gave birth to a calf. The calf was first seen by my father-in-law, Mr. Thomas, the owner of the cows, at ten o'clock in the morning, on February 26. She was then alone with her calf. During the day she led the calf to the rest of the herd in the large pasture, where there were also some mules. At three o'clock in the afternoon a she-mule had adopted the calf and driven the mother away. The mule staid close to the calf all the time, and between it and the cow. The latter is not afraid of dogs, and does not yield easily to other animals; in her own herd she stands third in the hierarchy of authority, but she did not dare to approach her own offspring. We do not know whether there had been a fight for 'possession.' In the afternoon Mr. Thomas undertook to drive the calf with its mother and the rest of the herd to a shed over half a mile off, and he had to put up a vigorous fight with the mule over the whole distance, not only to drive the calf, but to protect himself from the mule. When he finally reached the shed it took two of them to get the calf away from her and run it into the shed. Mr. Thomas is an old man who has had a very large experience with animals, but he declares that it was one of the hardest fights he ever had with an animal, and does not care to repeat the experience, although it was very interesting to him.

The mule was even more anxious about the calf, and very much more excited than its own mother was, and her anxiety was great. At

the shed the mule sought to regain possession by making a fierce charge through the herd and against the drivers.

I am aware of how mules 'get struck on the bell-mare,' but have never heard of a mule's taking possession of a young animal in that way, and do not recall a case of one animal taking away the offspring of another by force for adoption. It has seemed especially romantic to me from the fact that mules do not have offspring of their own. This may be a common incident, and of no special significance, but I have related it to you with the thought that it may perhaps be worth preserving.

Yours very sincerely,

FRANK CRAMER.

Sept. 5, 1907.

P. S.—This letter was written over four years ago and then laid aside with the thought that perhaps you would be less interested than I. But the facts still interest me. I was careful to verify every detail of the incident.

### BOOKS RECEIVED FROM JANUARY 5 TO FEBRUARY 5.

*The Philosophical Basis of Religion.* J. WATSON. Glasgow, Maclehose; New York, Macmillan, 1908. Pp. xxvi + 485.

*La Psychologie devant la Science et les Savants.* E. Bosc. 3<sup>e</sup> éd. Paris, Daragon, 1908. Pp. 392. [Devoted to various phases of the occult which it takes several lines to enumerate in the subtitle.]

*The Inward Light.* J. F. HALL. New York and London, 1908. Pp. 228.

*An Introduction to the Mechanics of the Inner Ear.* M. MEYER. Univ. of Missouri Studies, Science Series, II., 1. Univ. of Mo., 1907. Pp. 140.

*Skeletal Remains Suggesting or Attributed to Early Man in North America.* A. HRDLICKA. Bur. of Amer. Ethnology, Bull. 33. Washington, Gov. Printing Office, 1907. Pp. 113.

*Principes de Linguistique psychologique. Essai de synthèse.* J. VAN GINNEKEN. Leipzig, Harrassowitz, 1907. Pp. vii + 552.

*Mental Pathology in its Relation to Normal Psychology.* G. STÖRRING. Trans. by T. LOVEDAY. London, Sonnenschein; New York, Macmillan, 1907. Pp. x + 298. \$2.75 net.

*The Negro Races, a Sociological Study. Vol. I. The Negritos, the Nigritians, the Fellatahs.* J. Dowd. New York and London, Macmillan, 1907. Pp. xiii + 493.

*Plato's Psychology in its Bearing on the Development of Will.* MARY HAY WOOD. Oxford Press; New York, Froude, 1907. Pp. 63. 2/6.

*Zeitschrift für Aesthetik und allgemeine Kunsthissenschaft.* Hrsg. v. MAX DESSOIR. Bd. III., H. 1. Stuttgart, Enke, 1908.

#### NOTES AND NEWS.

PROFESSOR CARL E. SEASHORE, head of the department of philosophy and psychology, has been elected dean of the graduate college in the State University of Iowa.

PROFESSOR G. M. STRATTON, of the Johns Hopkins University, has accepted a call to the chair of psychology in the University of California, his duties there to begin in the fall of 1908.

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THE

# PSYCHOLOGICAL BULLETIN

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## THE FEELING PROBLEM IN RECENT PSYCHOLOGICAL CONTROVERSIES.

BY PROFESSOR CHARLES HUGHES JOHNSTON,  
*University of Michigan.*

The most recent discussions of feeling indicate that interest in Wundt's latest theory is not so acute. All of the speculations on this vital psychological subject reported in my too brief summary here take their departure in some way from James' original position. In French work particularly this James-Lange theory remains still the basis for interesting experimentation as well as constructive theorizing. For good reasons, not always clearly recognized by some prominent American and English psychologists, the James position should be characterized as a peripheral theory of feeling. A theory which makes no clear distinction between the affective life and the cognitive content of experience contributed from the various avenues of sense organs, including the more internal organic and kinesthetic material, is open to many objections. A more or less clear recognition of this is evident in all current literature on the subject. As few accept this well-known theory unreservedly nowadays, it seems profitable to review the fairly distinguishable tendencies now foremost in the field. I have elsewhere<sup>1</sup> attempted to suggest certain justifiable criticisms of the conceptions underlying German experimentation and theorizing, and other work whose origin and method may be traced to this general point of view. The fundamental and critical issue comes out more clearly in what I propose to discuss in the present article.

To refuse to accept the James theory one must resort either to some very precarious attempts to modify it, thus tending inevitably to

<sup>1</sup>*Jour. of Philos., Psychol. and Sci. Methods*, Vol. II., No. 4; Vol. II., No. 10; Vol. IV., No. 7; Vol. IV., No. 8; *PSYCHOLOGICAL BULLETIN*, Vol. II., No. 5.

obscure the crucial objection to the conception of mental life which underlies it; or one must substitute for it some variety of 'central' theory, laying himself open to the charge of resorting to 'spiritualistic' explanations. Every modern writer, it seems to me, may be classed as a representative of one or the other of these tendencies. Sollier,<sup>1</sup> conceiving all physiological activities as essentially identical with physical or chemical processes, and further, that these molecular nervous changes are concomitant with mental processes, concludes from considerations questionable for any theory, that the peculiar molecular action of the cerebrum itself, independently of the functioning of sense organs and of the additional kinesthetic material, is the exclusive seat of the emotions. He desires some theory that may, by exclusive structural reference, account for the distinguishing attitude-taking aspect of emotional experience, as contrasted with the over-worked sensationalistic or intellectualistic element of consciousness. He lays himself open to the ready criticism of being 'voluntaristic' in attitude, and 'spiritualistic' in explanation.

Th. Ribot,<sup>2</sup> in his latest published work, though devoting a whole interesting book to the discussion of one species of feeling, the passions, is vague as to his suggested physiological explanation. He does however put himself on record as opposed to the James explanation. He says rather guardedly that every emotional possession most likely indicates the existence of a peculiar and unique 'aggregate of psychic units,' and has necessarily a 'physical and cerebral substratum'; 'a localization and an active coöordination center whose synthetic unity *is* the feeling.' He very likely has in mind and employs purposely the conception of 'psychic center' in the sense more explicitly expounded by d'Allonnes, whose point of view will be taken up later. His use of the 'serial function of psychic centers,' and 'continuity of central excitement,' suggests a theoretic construction something like Wundt's Apperception Center. He may be tentatively classed therefore with those opposing James in favor of a more central theory, with those moreover who do not feel that it is profitable to attempt to re-adapt or modify any peripheral theory.

In the two latest issues of the *Journal de Psychologie normale et pathologique*, in a controversy between G. R. d'Allonnes<sup>3</sup> and H. Piéron,<sup>4</sup> we have the tendencies clearly and interestingly indicated.

<sup>1</sup> *Le mécanisme des émotions*, Paris, 1905.

<sup>2</sup> *Essai sur les passions*, Paris, 1907.

<sup>3</sup> G. R. d'Allonnes, 'Explication physiologique de l'émotion,' II., *Jr. de Psych.*, mars-avril, 1906, pp. 137-144, et *Ibid.*, nov.-déc., 1907, pp. 517-524.

<sup>4</sup> H. Piéron, 'Théorie des émotions et les données actuelles de la physiologie,' *Ibid.*, sept.-oct., 1907, pp. 439-451.

H. Piéron observes that very early in the history of research and controversy relating to the role of circulatory phenomena in matters of psychological interest, a high degree of technical perfection was reached, and admirable results obtained. François-Franck<sup>1</sup> has very well shown how naturally it comes about that the brain, in all its very delicate action even, is but the servant of the massive changes produced by the general circulation. From this natural starting-point it obviously comes to be conceived as the passive organ registering without resistance the variations of arterial pressure. Plentifully supplied with blood, motor manifestations are numerous and vigorous; despoiled of this, diminution of activity occurs and depressive manifestations result. Personality has no meaning, hence, for this kind of physiological psychology. To Mosso is due the introduction of this conception. François-Franck claims for the brain, however, an independent circulation. The general vascular changes cannot bring about a condition in the brain, if it itself is a prime cause of these vascular changes. Brain circulation is extremely rapid, circulatory variations comparatively slow. Consequently, cerebral vascular variation in turn precedes the peripheral process. This is the normal order of the phenomena. Great disturbances of the general circulation, however, do not of course occur without affecting cerebral circulation. In the typical emotional (?) process, says Piéron, the central changes precede the peripheral, and are not conditioned by the latter. William James relies upon a metaphysical (?) rather than a physiological explanation. Emotion is not, as James' theory implies, a fusion of a cœnesthetic complex and an intellectual element, which together in turn form a nucleus to which continually peripheral contributions add themselves. Emotion must be something other than a cœnesthetic state.

Pagano<sup>2</sup> has battered down this conception in some neatly performed experiments. Dogs, in a normal state otherwise, hence supplementing Sherrington's well-known experiments, were placed on a vivisection table and trephined at a point corresponding to the 'sillon post-croisé.' With a very fine needle curare was injected. Excitation of the anterior part produced 'emotional phenomena which are characteristic of fear.' In the 'syndrome' phenomena not characteristic of emotion were caused by the same stimulus. Posterior excitation

<sup>1</sup> Ch. A. François-Franck, *Cours du Collège de France et Travaux du Laboratoire*, pp. 46-58.

<sup>2</sup> G. Pagano, 'Le funzioni del nucleo caudato,' *Rivista di Patologia nervosa e mentale*, 1906, XI., 289-319, and 'Les fonctions du noyau caudé,' *Archives ital. de Biol.*, 1906, I., 46, fasc. 3.

called forth phenomena clearly indicative of the presence of the emotional state of anger, such as snarling, tendency to bite, etc. Of these normal animals, hence, not under the influence of narcotics or anesthetics, one, which had received the injection external to the median portion of this 'noyau caudé,' just after the injection grins, shows fury, bites the objects with which he is menaced and reacts with unmistakable (?) anger to the whole provoking situation. Another, whose injection was given in a different part of the brain, the top part of the median portion of the *noyau caudé* shows genuine anxiety, is terrorized by acoustical and visual stimuli, trembles, and shakes its limbs. These reactions are constant when the injections touch these specified regions; not otherwise. Intense emotions are hence possibly connected with localized central excitements. It is impossible yet on evidence to say that emotions correspond to distinct cerebral activities. It is, however, also impossible to say that they are mental products determined as to their qualitative nature by sensory or cognitive factors previously engendered by the stimuli in question, circulatory or otherwise. This possible hypothesis should, however, serve to cool the excessive ardor of those attached to peripheral theories, Piéron urges. Sherrington's experiments, too, despite the supposed refutation by James and others, gain significance if one admit the above as a possible hypothesis. These results are crucial in a way, and make it easier to think that emotions can be maintained independently of the support of peripheral contributions.

G. R. d'Allonnes,<sup>1</sup> relying on Bechterew,<sup>2</sup> has made claims similar to James' rejoinder to his critics, that the so-called emotional reactions might be purely automatic reflexes, citing that the excitement of the thalamus was sufficient to effect this motor reaction. The reactions of Pagano's dogs should correct such a misunderstanding of the function of the thalamus, thinks Piéron. The direct excitation of the thalamus will provoke the characteristic reactions. This is necessary, but not sufficient, to stimulate determined emotional reactions. The origin of the complete emotional reaction is demonstrably more central, where one should naturally (?) expect to find the real seat of emotion. It is begging the question to deny to Sherrington's or to Pagano's dogs the emotional experience and to refuse to attach to subcortical centers any psychical function, and at the same time to demand *a priori* for the cortex the exclusive seat of consciousness. Bechterew's animals, deprived of cortex, exhibit emotional reactions. Pa-

<sup>1</sup> *Op. cit.*, p. 138.

<sup>2</sup> *Les voies de conduction du cerveau et de la moelle*, 1900.

gano's experiments indicate that the seat of emotions is in the corpus striatum. This striated body, though near the thalamus, is very different embryologically, according to Van Gehuchten. Genetically it has a dignity, of function possibly, far higher than the thalamus, and almost equal to that of the cortex. Also fishes possess the striated body but not the cortex. They likewise seem to be characteristically emotional (fearful). Parallel functions might also be so localized in man. Hence, in the present state of neurological knowledge, a subcortical seat of the emotions is not *a priori* an untenable physiological theory.

A still further evidence of the existence of a genuine emotion is that the expression varied with the circumstance under which the stimulus was given. An additional favorable consideration is that it is just as reasonable for an emotion to exist under the above experimental conditions, as it is for ordinary emotional experiences to eventuate and in turn to disappear in normal life, sometimes coexisting with automatic responses, sometimes not being consciously present. In short, if we agree with H. Piéron, we can argue from these canine experiences similar ones for man just as we do as to what may be similar in intellectual functionings.

M. d'Allonnes, so claims his critic and opponent, has modified or rather inverted the James theory, by claiming that these mimic reactions do not participate by contributing *content* for emotions, but are only the expression of the emotions.<sup>1</sup> Neither of these makeshifts is necessary if we incline to find for emotions proper the subcortical seat above referred to. Piéron's is hence a physiological theory, but at the same time a central theory. This enables us to distinguish emotion from the simple sensory resultant of a cœnesthetic complex, as indeed introspection demands. At the same time it has the advantage of allowing for the distinct rôle of the emotions as well as of the intellect in mental life. Thus more simply and more coherently can we explain physiologically how the particular cerebral activity here concerned can influence and be influenced by cerebral excitements connected locally with sensory and more purely intellectual activities. Piéron deprecates the general tendency of the followers of James and Lange to call all theories of the central origin of the emotions spiritualistic speculation.

To this article d'Allonnes replies in the next and most recent issue of the same journal.<sup>2</sup> He thinks the views above set forth briefly are

<sup>1</sup> Similar attempts at thus modifying the peripheral theory will be reported later in this discussion.

<sup>2</sup> *Op. cit.*

wrongly founded upon a false underlying conception. He calls attention to the fact that Vulpian<sup>1</sup> contended that the Pons varolii was the central seat for elementary feelings, and Bechterew and Pagano that the seat should be in the optic lobe and in the striated body respectively. Further, Höffding<sup>2</sup> cites the case of a rat, deprived of both hemispheres and of the optic lobes, that exhibited fear when the mewing of a cat was imitated in its hearing.

M. d'Allonnes repeats almost the words of James that we can be sure only of the fact that the mimic automatism is preserved, not the psychic concomitant. M. Piéron's general conception of psychic centers is for his critic likewise inadmissible. The only legitimate conclusion from Pagano's interesting researches is that the particular subcortical area stimulated with curare was simply a section of the nervous circumlocution in action in anger or fear, and that this particular region of the head is merely an important crossway junction of mimic (?) emotional paths. This inference as to the function of the noyau caudé, to which M. Piéron attaches so much importance as the central stage and point of termination of central action where emotional states are in question, is not justifiable, even with his vague general conception of psychic centers. Piéron's inferences from Pagano's experiments hence are not legitimate. They merely indicate that, concurrently with this specialized excitement, a number of other centers participate. Likely it and many other areas are necessary conditions for emotional states. Of itself, the activity of no one center in all likelihood can suffice. The participation of this area in bringing about the physiological situation for emotional consciousness has long been known. This, however, is no justification for such an unqualified assumption. This is a far different thing, of course, from the assertion that this limited area, independently of the cortex and in the absence of the viscero-sensory nerve contributions, can function adequately and isolatedly. In Pagano's experiments the cerebral lobes were not removed nor were the centripetal nerves cut. According to the critic, Piéron fails to realize that modern French neurology excludes psychic centers from physiology altogether, substituting for such a conception that of 'psychic functional cycles.' Affection, just as other psychic operations, presupposes a psychic functioning of vastly complex systems of multiple centers. In Piéron's sense there are no visual nor auditory centers even. Only, hence, by a false conception of psychic centers can he draw support from Pagano's important researches.

<sup>1</sup> Vulpian, *Physiologie du système nerveux*, 1886, pp. 5-49.

<sup>2</sup> Höffding, *Outlines of Psychology*.

Likewise as to Sherrington's much discussed experiments, the critic thinks that Piéron has failed to understand the most serviceable contemporary psychological concepts of emotion and elementary affection. His (Piéron's) conclusions, hence, are not significant here. Piéron thinks that d'Allonnes has tended to explain away all purely emotional phenomena as complexes simply of sensations and intellectual elements; in short, of somatic impressions. This is clearly what so many critics have objected to in the James theory, however skilfully its adherents have sought to adjust it to the new considerations offered.

M. d'Allonnes' conclusions are interesting: "We conclude this discussion with the statement that unemotional feelings exist (Wundt's affective elements); that the absence of affective states does not prevent the conservation, the systematization, the active power of representations (images); that without the intervention of emotions the ideas and the acts can organize themselves stably in inclinations and in passions capable of influencing efficaciously one's conduct; that representative phenomena and active habits, and likewise emotions, are psycho-physiological forces, and are able, without recourse to reinforcement by affective factors, to constitute themselves solid complexes and to indicate their existence in automatic and reflex manifestations."

This very recent, highly and perhaps unwarrantably speculative controversy is, it seems to the writer, valuable. It clearly indicates the still chaotic state of the whole psychological as well as the physiological problem. It is refreshing too to see that here little use is made of Wundt's over-classified tridimensional conceptions. Experimentation solely with a view to add some little doubtful evidence for or against a theory somewhat arbitrarily adopted by most German and many American experimentalists, has not as yet tended mightily to clarify our conceptions, nor to stimulate further steps in formulating a more serviceable hypothesis.

The efforts at explanation above reported and the different conceptions with which the authors crudely work and somewhat dogmatically seek to controvert each other, offer an inviting opportunity for adverse criticism. Neither of them seeks, however, as one suspects of other writers not to be mentioned here, to veil in pseudo-profound terminology what they contend for. Both, too, can be easily understood to be honestly grappling with a real problem, and a current one. Piéron *knows* surely that the affective aspect of experience should not be confused with 'somatic impressions,' sensational or cognitive content. This is certainly a psychological objection to any peripheral

theory, and hence to the James theory. He is, however, so determined to justify his conviction by proof that he taxes the reader's reserve of sympathy with his genuine purpose. Feelings, however Wundt or anyone else may claim for them independent elemental constitution in the composition of experience, are, on the other hand, made just as unreal when one ascribes to them absolute, isolated, independent existence and function. Piéron is dangerously near the plane of Descartes when the latter formulated his theory of the preposterous function of the pineal body.

The exposition furnished by d'Allonnes of the serial character of vast central systems harmoniously functioning, and his conception of psychic centers in general, sound more modern and more plausible. He does, however, as quoted from his summary above, unmistakably tend to isolate aspects of experience in such a way as to throw all in a false light. It is novel psychology, for example, to be told, with such decision and assurance, that intellectual or moral states, with no affective factor, can efficiently (or otherwise) influence conduct. This is almost a return to platonic psychology. Ribot's discussion of the rôle of feeling in all imaginative processes, and his recent *Essai sur les Passions* have evidently not been deemed worthy of very careful consideration by the writers above cited.

It is clear to all students of the psychology of feeling that the following desideratum remains a genuine one, viz.: how shall one conceive the relation of feeling or affection to sensation? The original James theory is still important just because it states clearly an attitude toward this question. Carried out logically it identifies the two. James nowhere in his psychology, so far as I can find, recognizes that there are two elemental constituents of mental life. Hence, emotional states represent no especially troublesome variety of mental stuff. Both Wundt and Titchener, differing in many respects, do agree to work with the distinguishing concepts of sensational and affective elements. The so-called functional psychologists cover somehow their conceptual groundwork so completely that one can with difficulty understand just what distinctive functions they do ascribe to what the old classifications chose to call ideation, feeling, and willing. It is easy to follow Münsterberg and declare that only sensation complexes constitute psychological material. It is not so easy for such followers to refute Baldwin when he calls such procedure 'barren of results.'

It would not be difficult to show still that almost all psychologists are extremely reluctant to grapple with that vital part of every experience which we call, with sufficient clearness to be understood, *feeling*

Münsterberg's attitude is perfectly clear and as inexorable—and also equally hopeless, to my mind, if we are to deal in psychology with the affective aspect at all. He says, " Ideas and their elements alone can thus find a logically satisfactory description in psychology \* \* \*. An emotion or a volition is never an idea but their elements may be the same \* \* \* "; that is, emotions are for psychology only sensation complexes. He continues: " Our goal is, therefore, to replace the real emotions—etc., by complexes and sensations."<sup>1</sup> Höffding, in his address at the World's Congress of Arts and Sciences, will admit no necessity for this 'false transformation' of actual experience, which it is the business of psychology to describe as best it can. Münsterberg, because 'the emotions link themselves with physical causes or effects, and everything in respect to them is dependent upon doubtful observations and interpretations,' feels driven by logical necessity to transform them into 'ideas and their elements.' It should be noted that he consciously chooses to refrain from dealing with them directly. In the light of his whole conception, clearly, all of the efforts above and elsewhere reported are hopeless skirmishes into a forbidden and impenetrable field. This position would seem to justify one in considering Münsterberg a supporter of the James theory in so far as to agree that all emotions must be explained by sense contributions, peripheral or otherwise.

Another related point of view is interesting in this connection. W. McDougall desires to make use of the James theory modified in one important respect. He attempts to reconcile it as a peripheral theory with urgent claims which seem to him to have a certain justification as suggesting a 'central theory.' He says, " If this theory is modified by the recognition of the possibility of emotions depending upon revived or reproduced organic sensations, without the actual visceral changes, it would seem to fit all the facts."<sup>2</sup> This is a laudable modification apparently, but one fails to understand how McDougall has taken into account here, as he partially promised in an earlier part of his excellent discussion to do, the task of showing just what he means by emotion or feeling or affection, aside from the 'reproduced organic' sensation material whose existence he so carefully prepares ground for. Is there anything else? Mr. McDougall on the next page resorts to philosophizing, and the fundamental psychological query is not again broached.

Judd's<sup>3</sup> is perhaps the latest attempt to restate this problem, or

<sup>1</sup> *Psychology and Life*, pp. 50-51.

<sup>2</sup> *Physiological Psychology*, p. 114.

<sup>3</sup> *Psychology*, 1907, Chap. VII.

rather to explain it away. Sensations and ideas constitute the *content* of mental life. Feelings are not content, but mental attitudes. This sounds plausible till one begins to ask what one means by content of mental life. Judd dismisses without discussing, hence the perplexity the above writers have exhibited as to whether any peripheral contributions (the main thesis of the James-Lange theory) either condition or constitute the affective aspect of experience. His position seems, however, open to question as it stands. Judd says (p. 196) 'that feeling in its relation to bodily activity always reflects (?) the harmony or lack of harmony of active tendencies.' 'Pleasurable feeling is due (?) to coöperation of motor tendencies.' 'Disagreeable feeling is due (?) to a conflict of motor tendencies,' etc. True observations all will admit, but hardly a solution or a justifiable dismissal of the real problem. '*Feeling reflects*' active tendencies, or is 'due' to disruption of motor organization, etc., may mean that it is constituted by sensations which such a situation calls forth. It may mean that feeling is an isolated passive spectator, as it were. Or still again, the term 'attitude,' used for it so often, suggests that it may mean some active principle which controls the motor outgo to muscles. The problem in relation to the crucial controversies above and elsewhere reported is not made clear by Judd. The distinction between content and attitude does not successfully set aside the genuine obstacles which the authors above cited are attacking; at least it does not do so for those who think that our feeling life is no less vital and no less ephemeral too, necessarily, than the so-called ideational. "I have aimed," says this author in his preface, "to make as clear as possible the significance of ideation as a unique and final stage of evolution." He must approximate success naturally then, by excluding from this unique and ideal function and goal any but cognitive aspects of experience. Feelings must be excluded from content, and consistently they are for him. This sounds like a Platonic goal. If Royce's term for feeling, 'our present sensitiveness to the value of things' be not a misnomer, this distinction of Judd's, though tempting for many reasons it is to adopt it, seeing particularly how skilfully its author amplifies and illustrates it, might end by falsifying the very experience we seek to clarify. The term *content* savors of something one might find by introspection — and we are surely aware of feelings introspectively; and the term *attitude* smacks of Spencerian external description of physical acts only. This may be, however, a misunderstanding, or an unfair and apparently capricious construction. There is, however, no suggestion of any qualitative distinction of the affective and the cognitive phases of ex-

perience in this discussion. Feelings happen concurrently with bodily attitudes, but so do all more purely ideational states. The psychological question is not broached by Judd, save by the exclusion of feelings from the content of experience while still making them 'reflect' or 'be due to' kinesthetic reports to the brain.

The study of these emotions reveals to Calkins 'obvious inadequacies' in existing psychological conceptions. Yet her attitude toward the problem above presented so often is not wholly clear to the present writer. She speaks of affection and sensational elements<sup>1</sup> as somehow distinct, and thinks that it is expedient to describe emotions in terms of 'utility' for the evolving *self*, and further that the possible 'bodily attitudes' are not 'sufficiently numerous' to enable us thereby, as Judd urges, to use them as means to describe for psychology our long list of feelings, or emotions. This is clearly a resort to what the above-cited writers would consider a question-begging procedure. To quote again from the same author: "No constant organic sensation and no distinction in temporal reference sets one (emotion) off from another." Our almost total ignorance of organic sensations, as forcibly shown by Titchener in his address at the World's Congress, might tend to show such a claim untenable. The other statement, given by the same author, that the number of possible attitudes is insufficient to square with the number of possible emotions is, I think, adequately met by Münsterberg in his elaboration of the 'Actions theorie' in his *Gründzuge der Psychologie*, and in the second chapter of *Psychology and Life*. In short, there are reasons for a new method for describing feelings, but not because of *structural* inadequacy of our anatomy.<sup>2</sup>

This fundamental question as to whether we shall rigorously distinguish sensations and feelings, or identify them, so far as our psychology is concerned, is necessary to any construction of a theory.

<sup>1</sup> For one of many possible references to her writings, cf. PSYCH. REV., Vol. XIII, p. 78 ff.

<sup>2</sup> Calkins' latest conclusions, *Jour. of Phil.*, Vol. V., No. 5, Feb. 27, 1908, published since this article was sent to the press, are, that sensational and affective elements 'analyzed structurally,' though 'essential,' do not constitute 'an exhaustive account' of the 'concrete reality of which the idea is a mere abstraction.' According to her, psychologists should now proceed, equipped with these three fundamental, disparate elements; sensational, affective, and self factors. Her reasons assigned for the conceptual basis proposed are similar to those above mentioned, and indicate, I think, the same oversight which I have all along sought to point out; namely, the possibility that feeling fully understood and treated might go further toward exhausting our psychological account of the 'concrete reality of which the idea (sensation and image complex) is a mere abstraction.'

The vagueness on this prime conceptual issue is, more than anything else, the cause for the controversies and for the misunderstandings one finds in all the controversies. The original James Theory, as explained by him in answer to his critics some years ago, is as clear on this point as it is, to my mind, unsatisfactory. This is why it is pivotal in so many discussions. Münsterberg's position is clear enough, but feelings as such, admittedly, do not come in for psychological treatment at all. Wundt's Tridimensional Theory seems to exhibit some tone of forced classification. Titchener's criticism, that some of his dimensions, tension and excitement for example, are names for sensational not affective aspects of experience, seems better to square with introspection, and at the same time to indicate the necessity for a psychological recognition of these two aspects. The modifications of the James theory above cited, which are typical of others also, are not clear on this fundamental issue. I have elsewhere<sup>1</sup> hesitatingly ventured to suggest what seems to me a possible recourse for psychologists of feeling. This method, as yet vaguely conceived I admit, is open, I am clearly aware, to many objections, though I think not to the one important one which I seem to have found in most of the authors I have read on the subject.

Psychology has erred throughout its whole history in forcing our affective life into sensational or intellectual categories, and in adapting this choice and vital experiential material to the arbitrarily chosen and pretty well perfected psychophysical methods, suitable perhaps to sense data only. Psychophysical technique and laboratory procedure in general have thus far proved inadequate in the realm of feelings. Psychoneurological specialists have put forward opinions as to almost every possible structural reference for feelings, without however having in their own minds any clear concepts of the psychological stuff they seek to explain physiologically. The other mistake to be found also throughout the history of psychology is that of conceiving feeling as abnormal, and idealizing the cognitive aspect. The epistemological conviction, at the basis of the psychologizing, if fairly and succinctly stated, of many modern psychologists, as well as of Plato, Spinoza, or Kant, would logically be that the eventuation of feeling into something cognitive in character, indicates a good personal riddance. Ribot's recent writings<sup>2</sup> mark a welcome departure from this conception that feelings are abnormal mental manifestations. To me the

<sup>1</sup> *Harvard Psychological Studies*, Vol. II., and *Jour. of Phil., Psychol. and Scient. Methods*, Vol. IV., No. 8.

<sup>2</sup> Ribot's 'Theory of the Passions,' *Jour. of Phil., Psychol. and Scient. Methods*. In press.

keynote of the addresses by Höffding, Ward, Titchener, Cattell, and Baldwin, at the World's Fair Congress at St. Louis, is that a reconstruction of some of our psychological concepts is called for, and that possibly our methods may be made more inclusive and exhaustive. One desideratum certainly is that someone restate what one means by that aspect of experience suggested by the words affection, feeling-tone, feeling, emotion, sentiment, or passion, in such way that systematic investigations may coöperate in accumulating considerations pertinent and contributory to a constructive theory.

Professor J. R. Angell, in the usual genial capacity of reconciling the claims and ideals of structural and functional psychologists by including all the aims and methods of both, writes<sup>1</sup> that "it appears equally patent that a functional psychology which lacked wholly a correlative structural psychology, would be at best but a disembodied spirit, wandering restless over an unreal world." This is apparently the opinion of all modern psychologists of feeling. Structural psychology, writes Baldwin, looking toward a psychic atomism, is doomed to extinction. We presume to remark that, if this statement be true, it is chiefly because feelings are not and cannot be transformed into sensations. The distinctive structural basis demanded, in addition to the functional explanation in terms of varieties of coordinated motor adjustments indicated by Judd and others, is not clear. It seems not at all impossible, and eminently desirable, to shelve the historically useful conception of sensation, if we cannot extend its application to all mental life without falsely transforming the matter of experience; and to formulate in its stead, taking our clue from newly adopted ions or electrons of chemistry or physics, some more serviceable and workable concept of experiential elements. Ostwald's suggestion of experience as a form of energy (shall we say highly differentiated?), though possibly harking back to Anaxagoras' *νοῦς*, as most critics will surely observe, may not in the future prove entirely barren. It is interesting to recall that Ostwald's statement, "Psychical energy is merely transformed energy, from heat, possibly, for example," followed the inconclusive arguments brought out in the symposium on feeling at the American Psychological Association two years ago. At that meeting the various positions above noted were severally sustained, though the issue above emphasized was not mentioned. There were two objections offered to the Ostwald concept: one, that it was senselessly materialistic; the other, that it made the parallelist hypothesis useless. The fundamental concept of 'impulse' is apparently

<sup>1</sup> *Jour. of Phil., Psychol. and Scient. Methods*, Vol. II., p. 535.

chosen by some 'functional' psychologists to replace the 'atomic' suggestion of 'sensation.' Others, following Ward, prefer as the elemental common constituent the 'feeling of activity.' Many, as well known, contend for the two elemental constituents, 'sensation' and 'affection.' These tendencies are suggestive. They indicate pretty strongly, I think, that psychology will not, and cannot profitably, follow the exclusive limited course consistently mapped out by Judd in his latest book, prophesied by him briefly on page 299 of his *Psychology*.

There remains this consideration, at any rate, before accepting Professor Judd's directions. Despite the implications of James' theory above noted, we find elsewhere<sup>1</sup> from this same author the following statement: "Individuality is founded in feeling; and the recesses of feeling, the darker, blinder strata of character, are the only places in the world in which we *catch real fact in the making*, and *directly perceive how events happen*, and *how work is done*. Compared with this world of *living individualized feelings*, the world of generalized objects which the intellect contemplates is without solidity or life" (italics mine). Surely psychology is vitally concerned with the 'catching of real facts in the making,' of actual experience at work. If 'functional' or 'genetic' or 'self' psychology, or Höffding's 'individual psychology,' or Ward's concept of 'activity,' serve better than 'structural' attempts yet formulated, to offer the necessary leeway and light for the psychologists of feeling, they, or it, should supplant the more stereotyped method. So far, according to the conviction of the present writer, this conceptual, epistemological if you will, groundwork has not found a universally convincing nor even tentatively acceptable statement. Eventually, I believe some such reconstruction of conceptual elements, if psychology is to parallel the advances of her sister sciences, will have to take place.

<sup>1</sup> *Varieties of Religious Experience*, pp. 501-502.

## PSYCHOLOGICAL LITERATURE.

### MUSICAL LANGUAGE.

*Le langage musical et ses troubles hystériques.* JOSEPH INGEGNIEROS, M.D., Paris, Felix Alcan. Pp. 208.

Under the subtitle of his work Dr. Ingegnieros presents the first systematic report of defects of musical language hitherto published in which hysteria is constituted the specific etiological factor.

Dr. Ingegnieros' thesis premises with Spencer's familiar biological accounting of the origin of music, which postulates the fundamental correlation of feeling and expression, the conception being a psychological inference from the basic principle of reflex activity. Accordingly music is in its origin a vocal gesture,—primarily an emotional reaction produced through reflex innervation of the muscles of phonation, and becoming in the process of development a function of increasing utility to the individual and to the species. With an increasing complexity of emotional states there is developed concomitantly a nicer facility of muscular coördinations for producing the appropriate inflexions. Thus cadence, in the expression of the emotions, is the correlate of words in the expression of ideas.

With regard to the psychophysiology of musical emotion, the interesting discussion of the subject is best summarized in the author's own words. "Music," he says, "and, in its simple form, all musical sound—determines in our organism two kinds of reactions. The first are direct, simply reflex, varying according to personal idiosyncrasy and to the general conditions of the organism at the moment of stimulation; these reactions constitute musical emotion and are comparable to those of every other emotion. The other reactions are indirect, the musical excitation acting upon the psychic representation of preceding musical emotions; its medium is the association between the sensorial memory and the memory of corresponding emotional states; musical excitation acts upon it as the spoken word upon the memory of past ideas."

In his chapter on the psychophysiology of musical emotion Dr. Ingegnieros gives the results of researches by different experimenters upon the physiological reactions responding to musical stimulation and shows that the conclusions reached have not been always in accord.

Certain facts however seem well based and Fétré, whose investigations were limited to isolated sounds, got results corroborative of those obtained in experiments with complex musical combinations.

The author quotes extensively the important critical study of Vaschide and Lahy upon the question of the psychophysiology of musical emotion.

It is, however, to the indirect reactions that music owes its characteristic quality, such indirect reactions depending upon associations in memory with former emotional states, these in turn depending upon the personal predispositions, hereditary and acquired, of each individual. Thus the indirect musical emotions become intellectualized and "the difference between musical emotions and all other emotions must be sought in its psychological content, the psychological content of each individual determining his coefficient of musical intelligence."

Dr. Ingegnieros classifies the degrees of musical intelligence into five groups. There is of course no rigid partition between the contiguous members of the series, but more or less of an interlacing of their components.

I. *Musical idiocy* exists in cases in which sounds of different pitch are heard without the ability to perceive the difference or at least without comprehending in what the difference consists; where sounds are heard merely as noise, their position in the gamut being indistinguishable. The defect has been called by Ferrand tonal deafness.

II. *Musical imbecility* is a degree removed from musical idiocy in that here the subject hears musical tones, but without the feeling of their meaning. He makes no mental synthesis of the tones he hears and is therefore "musically deaf." As differentiated from tone deafness, which is perceptual, musical deafness is a psychic defect. There is sensory but not psychological audition, the subject being in a like situation to one who hears spoken an unknown idiom. As musical intelligence and therefore musical sentiment are lacking, the attempt to attain a musical education is futile beyond acquiring a certain measure of technical skill.

With group III. we reach the stage of *musical intelligence*, of which the hall-mark is "educability." The native faculty of hearing and understanding musical sounds is warrant of the ability to hear and understand more.

Groups IV. and V., comprising *talent* and *genius*, show still higher level in the development of musical aptitudes.

Turning to the clinical study of musical language we observe a precise analogy between the emotional and the ideational systems of

language, each of the centers of musical expression consisting of a specialization of the particular speech center of which it is the correlate. Notwithstanding this analogy, musical language is a distinct function of ordinary language, having "its specific images, which may be educated, modified, and dissociated independently of the homologous forms of verbal language."

In addition to the four corresponding functions in both forms of language, musical language presents a further mode of expression, with a concomitant specialization of cerebral cells forming a fifth center, that of images for instrumental execution, which has no counterpart in ordinary language, though its analogy is found in the various forms of instrumental writing, as, for example, that of type-writing. Dr. Ingegnieros claims the distinction of being the first to have described this center.

While the author does not take account of a sensory type of images, parallel to the motor type for musical execution, this memory type follows as a necessary correlate. Besides, the existence of such sensory images is shown in view of the number of players who depend upon the visual images of the position of the fingers upon the instrument or of the actual place of the keys, for their memory of the first notes of a given piece, and from the further fact that many musicians experience musical sensations as effectually, by observing the keys struck upon a silent clavier or a windless organ, as by hearing the corresponding sounds.

In a survey of the specific defects of musical language one still traces the thread of analogy, which is interwoven throughout the author's discussion of the comparison of verbal and musical language, the amusias being assimilated to the aphasias of common speech; the form of aphasia which is alone characteristic of musical language being that of instrumental amusia, due to the inability to play upon an ordinarily familiar instrument.

In his description of amusia Dr. Ingegnieros adopts the following terminology.

Amusia may be *pure* or *combined*, according as it exists independently of or in association with aphasia. It is characterized as *total*, *multiple* or *partial*, depending upon whether it involves all, several, or only one of the forms of musical language. *Complete* and *incomplete* refer to the extent of the suppression of the diseased function.

The hysterical defects of musical language are given in three groups: I. Hysterical amusia — loss or dissociation of the different

functions of musical language. II. Hysterical hypermusia — pathological exaggeration of musical expression. III. Hysterical paramusia — a morbid aberration of musical expression.

The author insists always upon the functional nature of these anomalies of musical speech and of their systematization, as characteristic of hysteria. The hypermusias and paramusias are less systematized and require no special comment. Of the six cases of hysterical amusia the most significant deserve mention.

The first is an instance of a *pure, total* amusia — a musical aphasia involving all the functions of musical speech, but only of musical speech, the functions of verbal language remaining completely intact.

Another case of interest, since it shows the absence of a parallelism in the forms affected in the two systems of language, is that of a patient who lost the ability to write the ordinary symbols of language, but was still able to write the musical ones.

A third case illustrates a dissociation of the memory form of musical language which Dr. Ingegnieros has been the first to signalize — that of a *pure* instrumental amusia, the subject's memory for the remaining forms of language, both verbal and musical, being unaffected.

The interpretation of these functional derangements of musical expression is interestingly discussed in a comparative survey of the psychological point of view of Janet and of the physiological of Sollier, from which emerges the author's synthesis of the two seemingly opposed theories, as follows: "The two fundamental theories, in so far as concerns the genesis and the nature of hysteria, are complementary, in spite of their contradictory appearance. The first is a clinical, essentially descriptive explanation of the phenomena, and the second is a physiopathological interpretation of these same phenomena."

Dr. Ingegnieros' work is rich in bibliographic citations and possesses the charm of an exceptionally facile literary style.

TRIGANT BURROW.

JOHNS HOPKINS UNIVERSITY.

### FEELING.

*Feeling Analysis and Experimentation.* CHARLES HUGHES JOHNSTON. Journ. of Phil., Psych., and Sci. Methods, 1907, IV., 209-215.

The object of this article is to suggest certain new methods of experimentation which could profitably be employed in a future study of the affective phases of consciousness.

In past years experimenters generally have looked for an explanation of feelings in the reactions of the respiratory and circulatory systems. Drawing any conclusions from these involuntary movements is a difficult matter. Johnston believes the voluntary types of movement would lend themselves more fully to characterization and classification, and that to describe feelings one must describe bodily attitudes or incipient tendencies to adjustments which always accompany the feeling. Feelings may show themselves by different bodily modifications in different persons so that no definite localization can be made which would apply to all persons.

The author shows the difficulties which are presented in an experimental study of this problem. These may briefly be summarized as follows:

Good introspective notes are difficult. Feelings have qualitative relations to other feelings. Feelings tend to fuse into a single elemental feeling. Feelings cannot exist without the sensational elements. A brief summary of the views held in regard to feelings precedes this discussion.

In connection with this article should be noted the author's earlier published experiment in the *Harvard Psychological Studies* entitled 'Combination of Feelings.'

ROBERT D. WILLIAMS.

YALE UNIVERSITY.

*Ueber Urtheilsgefühle.* THEODOR LIPPS. Arch. f. d. ges. Psych., VII., 1-33.

This is one of Lipps' bits of logical deductions marked, as is usual, by fine distinctions and strict respect for his premises. The premises for the argument are that feeling arises only through checking or furthering of activities. Judgment on the other hand is an act, the 'goal of a completed activity, and therefore no longer open to the influence of furtherance or retardation. There can then be no feeling attached to judgment itself.

Every object must, however, be apperceived and as this process may be furthered or checked, the perception of every object gives rise to pleasure or its opposite. Similarly, we picture ourselves or others as having acted freely or as opposed in action and these remembered or possible struggles or lack of struggle give rise to pleasure. Ästhetic pleasure too is an *Einfühlung* of activity of this kind. There attaches to every judgment a feeling; but it is not inherent in the judgment itself but is connected with the uncontested presence of the idea; it is idea feeling not judgment feeling.

Granted all the assumptions, as I presume few would be willing to do, the author's conclusions seem assured.

*Les caractères affectifs de la perception.* DR. WAYNBAUM.  
Jour. de psych. norm. et path., IV., 289-311.

Dr. Waynbaum attempts in this article to account for the fact that perceptions arouse emotions. He finds that there are two distinct forms of emotion associated with the perceptions, the reflex and the conceptual or sympathetic. The first form arises through the reflex excitation of the emotional center in the floor of the fourth ventricle. Whenever the perceptions are new or unexpected they spread in some degree or other to this center, otherwise they go directly over the ascending paths to the cortex. The more conscious form of affectivity arises through the path that connects the cortical ideational centers with the lower emotional centers. It is this that gives rise to all symbolically aroused emotions, to sympathy and all other emotions that arise through or as the result of contemplation. Music attains most of its charm through the second connection, as is evident from the fact that enjoyment grows on repetition.

The article as a whole is a well written application of the current theory of emotion. The relatively new suggestion of the two paths corresponds fairly closely to the usual distinction between feeling and emotion, but seems difficult to apply in practice, more difficult in fact than the present distinction.

W. B. PILLSBURY.

UNIVERSITY OF MICHIGAN.

### PSYCHOPHYSICS OF HEARING.

*Die Beeinflussung der Sinnesfunktionen durch geringe Alkoholmengen.* I. Teil: *Das Verhalten von Unterschiedsschwelle und Reizschwelle im Gebiet des Gehörssinnes.* WILHELM SPECHT.  
Archiv f. d. ges. Psychologie, 1907, IX., 180-295.

The purpose of this investigation is the scientific study of the influence of alcohol on mental processes. The difficulty of observations on this influence lies in the the fact that introspection as a rule is impossible. This disadvantage is offset, however, by the possibility of using quantitative variation, by administering different doses of the drug. The subject need suffer no lasting ill effect if only a limited series of experiments is taken.

Since Exner's first publication on the effect of alcohol on mental processes, a great number of investigations have been carried on along

this line, among which those of Kraepelin and his pupils are the most important. The method employed by Kraepelin and his school was that of time measurement. This can be used in two ways, (1) by measuring the time between a signal which starts certain mental processes and a reaction movement which terminates them, or (2) by counting the number of simple acts which are performed in a certain time. The investigations carried on along these two lines show chiefly that large doses of alcohol diminish not only intellectual but also motor efficiency, whereas small quantities of alcohol diminish intellectual efficiency from the start, but quicken motor processes at first and lengthen them afterwards. Further results are that the apperceptive function is impaired, and the quality of associations disturbed. These facts exhaust approximately our present knowledge of the effect of alcohol; the proof that all intellectual functions are inhibited is still lacking.

The simplest mental processes are sensations. The effect of alcohol on the accuracy of sense perceptions may be studied by observing the threshold of difference (the smallest perceptible difference) and the threshold of sensation (the smallest perceptible stimulus). The problem is conveniently divided into two parts: (1) observations on the effect of different quantities of alcohol, (2) the temporal relations of this influence. The tests were made for the sense of hearing. The instrument used in the experiments for determining the threshold of difference was a phonometer, which was a modification of the instrument described by Wundt. The modifications had chiefly the purpose to keep constant the interval between the preparatory signal and the first stimulus and the interval between the standard and the comparison stimulus, and to ensure the absence of changes in the quality of the sounds produced. The instrument was very satisfactory. The method used by the author had the essential features of the method of irregular variation. The computation was based on the corrected numbers of relative frequency of right cases. The results of the experiments are not only given in tables which show every detail, but illustrated by diagrams which afford considerable help in understanding the author's arguments. For the student of psychophysical methods it will be interesting to notice that no use at all is made of the notion of a threshold, and that the argument is based merely on the corrected numbers of relative frequency of right cases. It is safe to say that the discussion is more convincing than if it were based on the notion of a just perceptible difference as it is usually defined.

The results for all the subjects have the same general features. The series in which no alcohol was administered show a very decided

effect of practice, which is entirely lost when the drug is taken. Not only is the influence of previous practice lost, but apparently no practice is acquired in alcohol series. The corrected numbers of relative frequency of right cases in the alcohol series are invariably below the corresponding numbers of the series without this influence. This decrease is due not so much to an increase in the number of wrong cases as to an enormous increase of equality cases. There exists, furthermore, a marked tendency to overestimate the second sound. It must be remembered that the experiments were taken at different stages of the effect of the drug and are perhaps not quite comparable. This is, however, no serious objection, since the experiments of Kraepelin have shown that the effect of somewhat larger doses of alcohol sets in very rapidly and remains at a considerable height for some time. Account was taken of this fact by beginning the experiments seven minutes after administering 40 ccm. of the drug and continuing them for 45 minutes, so that one may suppose the effect to be the same in all the experiments.

The author proceeds to study the temporal development of the influence of alcohol by the method of right and wrong cases. Experimenting with subliminal differences he found a very marked effect of practice, the relative frequency of correct judgments showing a considerable increase after a few experiments. This proves that the adaptation of the subject for a given difference of intensities is better if the same difference is presented repeatedly. The conditions of the method of right and wrong cases are, therefore, more favorable to the formation of a correct judgment than those of the method of just perceptible differences. This observation has some bearing on the problem of comparing the results of these two methods. The effect of the drug is shown by the numbers which indicate the frequency of the right cases; they are always below the corresponding number in the series without alcohol. The effect sets in soon after administering the drug (4-8 minutes) and reaches a maximum rather rapidly; the effect remains at its height for some time and then falls off gradually. There is no qualitative difference between the effect of large and of small doses of alcohol, but the effect of large doses is greater and lasts longer. There is also a marked effect on the amount of overestimation of the second stimulus which is greatest when the effect of the drug is at its height. The author concludes this part by giving some computations of the threshold of difference for which G. F. Lipps's method is used.

The second part of the paper contains the investigations on the

minimal stimulation for sensations of sound. For these experiments a phonometer of different construction was used. Determinations of the smallest perceptible intensity of sound have a certain practical interest, since they are used to find deficiencies of hearing. The author confirms previous observations on the impossibility of keeping the subject in absolute stillness, first, because it is not possible to construct a sound-proof room, and second, because of unavoidable involuntary movements which always produce some noise. As regards the size of the ball of the phonometer, he remarks that it must not be reduced beyond a certain limit, since it is difficult to give small balls an absolutely spherical form, and the slightest deviation from this produces very noticeable differences in the quality of the sound produced. An incidental observation showed the importance of avoiding even slight changes in the position of objects in the room. It is, furthermore, not a matter of indifference in which direction from the sounder the subject is posted, since the sound is reflected from the walls of the room. The intensity is greatest along the diagonal of the room.

For the determination of the smallest perceptible stimulus the method of just perceptible differences is in general use. One encounters here the same difficulty as in determining the threshold of difference by this method, namely, the inversions in the series of judgments which the subject gives; hence, the author decided again to adopt the method of irregular variation. The most striking feature of his study of the absolute threshold, however, is the use to which he puts the so-called *zero cases* (*Vexierversuche*, *Nullversuche*, control tests), which formed an essential feature of the research. It was found that the number of errors in these tests depended on the amount of intensity used in the preceding experiments; it depends, therefore, on the adaptation of the subject. The numbers of these errors were smaller in the series with alcohol, and furthermore, errors were committed for smaller intensities in these series than in the normal. This fact is important in the following respect. The numbers of relative frequency of right cases in the series with alcohol are larger than in the series without. This result may be interpreted either as indicating an increase of the sensitivity, *i. e.*, a lowering of the threshold, or by the fact that a subject who has partaken of alcohol has greater confidence in his judgment and gives judgments of difference where he ought to give judgments of equality. If the latter interpretation were right we would expect an increased number of errors in the control tests, whereas the diminution of the number of errors in the control tests proves that the threshold of sensation decreases under the influence of

alcohol. The temporal variations of the threshold were studied in the same way as in the threshold of difference. A complete correspondence was found between increase of the threshold of sensation and decrease of the threshold of difference. When the latter increases the former decreases, and both variations reach their maximum at the same time. The author's discussion of the overestimation of the second stimulus may throw some light on the nature of the Fechnerian time error. In listening to a metronome the last beat as a rule is judged to be the stronger if no special attention is paid to comparison of the stimuli, but both beats seem equal if attention is adapted to comparing the sounds. This means that our comparison of two sound stimuli without special attention shows the same shortcoming as that noticed in a subject under the influence of alcohol. There remains, however, the possibility that the field of consciousness is reduced by the influence of the drug and that the subject is not able to retain both stimuli in consciousness.

The paper of Mr. Specht is a prize essay. The study is remarkable in several respects. The most striking feature of the method employed is that the author bases his deductions merely on certain numbers of relative frequency. The study of the threshold in the strict sense of the term covers little over three pages and might have been omitted altogether without the paper becoming less convincing. This shows that the mere numbers of relative frequency obtained from different subjects are sufficient to compare the accuracy of sensations. The author does not quite get rid of the traditional way of treating the problem in so far as he uses the distinction between right and wrong cases. Correctness and incorrectness of judgments are logical categories, whereas the real judgments are that the comparison stimulus is greater or less than the standard or that the stimuli are equal. These three classes of judgments occur on a given difference of intensities with certain relative frequencies. It has been shown lately that this act is sufficient to give the foundation of the method of just perceptible stimuli, and therefore indirectly of all the psychophysical methods.

F. M. URBAN.

PHILADELPHIA.

## ORGANIC SENSATIONS.

*Zur Frage der Sensibilität der inneren Organe.* E. MEUMANN.

Archiv für die gesamte Psychol., IX., 26-62.

*Ueber Organempfindungsträume und eine merkwürdige Traumerinnerung.* Ibid., 63-70.

Four series of facts are summarized by the first paper; facts obtained by surgeons, physiologists, pathologists, and those facts collected through common observation and controlled introspection. In general, experimental surgery finds that in the abdominal region the parietal peritoneum and the musculature of the diaphragm are able to mediate pain, pressure, cold and warmth by the stimuli that arouse these sensations in peripheral regions. Only the sensations mentioned are mediated and no other portions of the viscera are able to mediate sensations of any sort. Lennander, a surgeon quoted, concludes that the abdominal organs are not furnished with sensory nerves. The physiologists draw similar conclusions. Weber found that drinks of cold or warm water did not produce sensations beyond the mouth and larynx until the change in temperature had had time to penetrate to the surface of the body as tested by temperature changes at the surface. Later physiologists affirm this and some even state that the sympathicus mediates no sensations, others admit the transmission of pain by way of the rami communicantes. The results from these two fields are negative regarding inner sensations.

On the side of introspection, the writer reports some daily observations of his own, and summarizes these together with the commonly known facts, and some earlier notes by Helmholtz, to show that there are many and varied sensations that arise internally and report to us the condition of the bodily organism. Other than those usually noted, M. describes some that are made possible in his case through a particularly sensitive heart muscle. A definitely localized sensation in the region of the heart was noticed whenever any special exertion was made, this could be easily checked by the heart sounds and beats. Pathology supplements introspection and adds definite information regarding the localization of the two special groups of sensations next mentioned. In several cases observed by Sollier and Revault d'Allonne, where the patients suffered from total anaesthesia of the digestive canal and bladder, agreeable and disagreeable states of consciousness, the feeling basis of the emotions, fear, fright, aversion, loathing, etc., and the passage of time seemed lost. Teleologically, the place for inner sensations seems plain, they are needed as warnings in order

that the organism may be capable of self preservation. There is a strange omission here of cases showing reverse phenomena.

Why are these sensations so indefinite? Helmholtz states that in the case of such organs as the vocal cords and all whose movements must be finely differentiated, the sensory reports arising therefrom are indefinitely localized. Using this analogy, Meumann suggests that the qualitative indefiniteness of the inner sensations is due to their indefinite localization. This is further due to the fact that vision and visual images do not share in their determination. ‘*Innere Wahrnehmung*’ needs beside the qualitative distinction, certain ‘*Anhaltspunkte*,’ the most important of which is visual localization.

The opposition that seems to exist between surgical observations and physiology on the one hand, and pathology and introspection on the other, is probably one of viewpoint and theoretical conclusion and not one of fact. It is possible that the inner organs are not responsive to stimuli that are adequate in the case of peripheral end-organs but do respond to physiological and pathological conditions. Head’s theory of ‘reflex-pains’ is referred to in an addendum, and is found to substantiate the above conclusions and to furnish an anatomical and theoretical basis for the peripheral localization of many of the internal sensations. Meumann concludes that these inner organs do have sensory nerves and that introspection probably finds sensations that the surgeon is not able to arouse experimentally with his ‘inadequate’ stimuli. He promises a further paper in which the relation of these facts to the Lange-James theory of the emotions will be considered.

The second article is a statement of a particular set of dream-phenomena experienced by the writer at different times during the past twenty-three years. Only those dreams are given in this paper that are recurrent (*Wiederholungsträume*). Of these, three types are mentioned, a division based on the dream thema. These are ‘*Abgrundträume*,’ or falling dreams, ‘*Eisenbahnträume*,’ and ‘*Fliegeträume*,’ the second of which has repeated its theme over fifteen times. The first sort were most frequent in his high-school days, when he was especially troubled with asthma; the second accompanied the period when M. was troubled with a heart neurosis, and difficulty in breathing after any slight exertion; while the third type has appeared in the last fourteen years of his life and is both pleasant and unpleasant in tone; it being very difficult to locate the sensations that accompany the pleasurable toned, though in both it seems to be a slight dizziness that is easily recognized when the dream becomes unpleasant in tone and is usually located about the head with infrequent localization in the

region of the heart. Each theme is accompanied by the external conditions and circumstances of M.'s life.

These 'repetition' dreams are always connected with organic sensations of some kind and depend for their imagery on past experiences. In those instances where the dream is pleasurable toned the subject seems to give himself over to the dream, while in others there is a distinct sense of opposition. This sense of resistance seems bound up with the bodily reflexes, as drawing back from cliffs, compensating movements of the body when riding a swiftly moving train around a curve, etc. Constant repetition has enabled the recognition factor to appear; in cases of deep sleep following unusual fatigue this does not interrupt the dream, but in others it awakens M. In one instance the dream of the moment was mistaken for an actual experience and the thought passed through his mind that now he was *really* going through the scenes of his earlier dreams. The idea of movement carried out (*ausgeführte Bewegung*), is not obtained in the dream until the actual muscle, joint and tendon sensations arrive centrally, though the innervation phase may reach a very high pitch. One does not run in his dreams till his body actually moves. Sensations are experienced in dreams as in real life; the 'labored' heart, the 'catch' in one's breath, are not merely known upon waking, but are also memories of sensations in the dream conditions.

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### DREAMS.

*Interprétation de quelques rêves.* ALPH. MAEDER. Archives de Psychologie, 1907, VI., 354-375.

Dreams are not the product of disordered mentality, but are the result of two antagonistic forces, a desire, almost always repressed, and a reproof or censure, which modifies or arrests the passage of the dream. Important phases of a dream are condensation, the fusion of unlike elements, transference of emotional interest to insignificant ideas, and dramatization or the transforming of an idea into a situation. Maeder's general standpoint is the same as that of Freud (*Die Traumdeutung*, 1900). For the most part the article is devoted to the psychological analysis and interpretation of four representative dreams, intended to illustrate the author's theory of dreams.

MABEL CLARE WILLIAMS.

UNIVERSITY OF IOWA.

## ILLUSIONS.

*The Vertical-horizontal Illusion in School Children.* W. H. WINCH. Brit. J. of Psychol., 1907, II., 220-225.

A gradual increase in the age of the observers from seven to fourteen years was accompanied by a gradual diminution of error. This was found true in three different schools; but, when a fourth series of exercises was given to a number of adults averaging twenty-four years, the illusion was almost as large as that of the youngest pupils, although the observers 'had received the usual education of well-to-do English people.' "It remains to be seen how far the civilized child passes through the stages of development now exemplified in the savage." "Whatever functions are operative they must be such as diminish in influence with the normal growth and progress of a school-boy."

A. C. ROBBIE.

UNIVERSITY OF IOWA.

## ANIMAL BEHAVIOR.

*The Dancing Mouse, a Study in Animal Behavior.* ROBERT M. YERKES. (The Animal Behavior Series, Volume I.) New York, Macmillan Co., 1907. Pp. xxi + 290.

The title of Dr. Yerkes' volume perhaps hardly prepares the reader for the real nature of the work. *The Dancing Mouse* conjures up somewhat fantastic images. The book is a thoroughly scientific study of behavior in one of the higher animals,—a work of really fundamental interest to all students of comparative psychology. The distinguishing feature of the work lies in the ingenious and extremely valuable methods of experimental investigation worked out by Yerkes; this makes the book really indispensable to every investigator in this field. At the same time the fancier of pet dancing mice will find in the book a most interesting account of the habits and other peculiarities of his pets.

The first five chapters are devoted more particularly to the special peculiarities of the dancing mouse; to its origin and history; to its extraordinary 'dance' movements; to methods of breeding and care; to the controversy that has long existed regarding the structure of the ear and the sense of hearing. With the sixth chapter, on the sense of hearing, begins the account of the author's own investigations. Yerkes shows that the mouse is deaf save for a few days in its third week of life, while his summary of the evidence indicates that no

structural peculiarities are yet known that will account for the deafness.

The most original and valuable part of the book follows, in the chapters on the sense of sight, and on the formation of habits. Dr. Bohn has somewhere said that the earlier work of Yerkes on formation of habits in lower animals ' resteront classiques, et devront servir de modèles à tous ceux qui aborderont les mêmes questions'; the same remark would certainly apply to the experimental methods described in the present work. Perhaps the most striking feature of Yerkes' special methods lies in the fact that he makes use of the educability of the animals in the study of sense physiology and in similar problems. The simple but extremely ingenious apparatus for this purpose, described in Chapter VII., should be of the greatest value to other investigators. The essential points are as follows: The animal is in a confined space, from which it seeks to escape and return to its nest. Two passages are open to it, one leading to freedom, while choice of the other results in the animal's receiving an electric shock. The 'right' and 'wrong' passages may be interchanged at will, and they may be marked differently, as by cards of different form, color, degrees of brightness, or the like. The animals are then set to learn the 'right' passageway, by choosing the 'right' signal. In this way Yerkes investigated color vision, brightness vision, Weber's law for sight, perception of form, and the like. The method, properly modified, appears to lend itself to indefinite extension, in investigating other problems and other animals. Yerkes' account of his investigations and results by this method have a really dramatic interest. Such interest is likely to evaporate when the story is condensed, so we will attempt no résumé. The original should be read.

The chapters on the formation of habits are of equal interest. Here again the development of extremely ingenious methods of investigation is described. A number of subjects not often treated experimentally in animals are here dealt with: the comparative efficiency of different ways of training; the duration of habits; memory and relearning; individual differences in behavior; the inheritance of forms of behavior; and the like. Some uncompleted experiments on the inheritance of *acquired* forms of behavior are briefly described.

The book attempts no generalizations, nor does it try to introduce new concepts or make new definitions. It is essentially a monographic treatment of certain aspects of behavior in a single animal; and even from this standpoint it is of course very incomplete, since but a small part of the field is covered. Yet it is doubtless the fullest, most satis-

factory, and most suggestive experimental account that we have of the behavior of any higher animal; and its great value lies in its inspiration for farther work. Though the book does not treat general problems explicitly, the author's experience leads him at times to well considered asides on general topics; for example the remarks on page 274, regarding the misleading nature of averages and the necessity of work with the individual, are worthy of careful note. The book is clearly written, in such a way that it can be read with understanding and interest by any intelligent person.

The question may be raised whether so thorough and fundamental an investigation might not better have been carried out on a less aberrant creature than the dancing mouse. Yerkes however is evidently of the opinion that its peculiarities give it special advantages for such work; this is of course quite possible.

This work is the first of a proposed new series of books on *Animal Behavior*, of which Dr. Yerkes is the editor. The announced second volume, on the *Animal Mind*, by Margaret Washburn, shows that the series is not to be limited to monographic accounts of experimental investigations, but is to include also books of a more general character. The volumes are published in unpretentious and inexpensive form, yet in a satisfactory way as regards print, paper, illustrations, and the like. The series should be of much value if the excellent character of the first volume is maintained.

H. S. JENNINGS.

JOHNS HOPKINS UNIVERSITY.

### SOCIAL PSYCHOLOGY.

*La vie sociale et l'éducation.* JULES DELVAILLE. Paris, Alcan, 1907. Pp. 200.

This book is a literary exercise rather than a scientific or critical treatise. It is a comprehensive, symmetrical partition of the inter-relations of education and social life, well stocked with opposite references to modern philosophical literature, and set forth in a clear and graceful style. The whole field of education is laid out as an architect might plan a landscape garden for a noble palace: 'physical education' here, 'intellectual education' there, 'social education' in the middle, culminating in 'moral education and the philosophy of life.' It is beautiful, it is ennobling, but it marks no specific advance.

W. C. GORE.

UNIVERSITY OF CHICAGO.

*La morale sexuelle.* ANTOINE WYLM. Paris, Alcan, 1907. Pp. 327.

The book is mainly practical in its intention and discusses the personal and legal aspects of the sex relations. Chapters on the psychological point of view, however, give a statement of the evolution of the moral conceptions and sentiments. Three stages are brought out clearly: (1) *La morale spécifique*, the forces by which nature secures such conduct as is advantageous to the species. The forces are, in a sense, external to the individuals, hence the stage may also be called *la morale extérieure*. (2) Individual morality, which is subjective and in which the individual often opposes the welfare of the species. (3) Social morality, in which the influence of the social group is brought to bear in a way that may not accord with either the interest of the species or with that of the individual.

J. H. T.

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### NOTES AND NEWS.

DR. R. P. ANGIER has been promoted from Instructor in Psychology to Assistant Professor at Yale University.

PROFESSOR MAX MEYER, of the University of Missouri, and Professor R. M. Ogden, of the University of Tennessee, had ready for publication last fall an English translation of Adolf Hildebrand's 'Das Problem der Form in der bildenden Kunst,' to be published by G. E. Stechert & Co., New York. In shipping from the printers to the publisher, the whole edition was lost. The book will be reprinted as soon as possible.

ACCORDING to later announcements the International Congress for Philosophy is to begin on August 31 and continue till September 5. Papers are limited to fifteen minutes each. One section of the Congress will be devoted to Psychology. Those wishing to present papers are requested to communicate with the General Secretary, Dr. Elsenhans (Plöck 79, Heidelberg).

PROFESSOR E. F. BUCHNER, of the University of Alabama, has been appointed professor of education and philosophy in the Department of Philosophy and Psychology at the Johns Hopkins University. Dr. J. B. Watson, of the University of Chicago, has been made professor of experimental and comparative psychology in the same institution. Both will enter upon their duties in September.

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THE

# PSYCHOLOGICAL BULLETIN

PROCEEDINGS OF THE THIRD ANNUAL MEETING OF  
THE SOUTHERN SOCIETY FOR PHILOSOPHY  
AND PSYCHOLOGY, WASHINGTON, D. C.,  
FEBRUARY 26 AND 27, 1908.

REPORT OF THE SECRETARY.

The third annual meeting of the Southern Society for Philosophy and Psychology was held at the George Washington University, Washington, D. C., in affiliation with the Department of Superintendence of the National Education Association of the United States. President Roosevelt received the members of the Department of Superintendence and of the visiting societies at the White House on Wednesday afternoon, February 26, at 2:30 o'clock. The two sessions of the Southern Society were held in University Hall on February 26 and 27, at which the papers by the members mentioned below were read before the Society.

At the business meeting the officers for 1908 were elected as follows: *President*, Professor J. MacBride Sterrett, George Washington University; *Vice-President*, Professor Albert Lefevre, University of Virginia; *Secretary-Treasurer*, Professor Edward Franklin Buchner, University of Alabama. Elections to vacancies on the *Council* constituted the elective membership of that body as follows: to serve one year, Professor A. Caswell Ellis, University of Texas, and Professor Edgar James Swift, Washington University; to serve two years, Dr. William T. Harris, Washington, D. C., and President D. B. Purinton, West Virginia University; to serve three years, Professor J. Mark Baldwin, Johns Hopkins University, and Mr. Reuben Post Halleck, Male High School, Louisville, Ky.

On nomination by the Council, the following were elected to membership in the Society: Dr. Frank Bigelow, 1265 Massachusetts Ave., Washington, D. C.; Dr. N. Trigant Burrow, Johns Hopkins

University; Professor Edward I. Devitt, Georgetown University; Professor Shepherd Ivory Franz, George Washington University; Professor Robert H. Gault, Washington College (Md.); Professor David Spence Hill, Peabody Normal College; Mr. Frederick Hornstein, Johns Hopkins University; Dr. E. E. Rall, University of Texas; Dr. Edward E. Richardson, 406 Seventh St., S. W., Washington, D. C.; Professor William Carl Ruediger, George Washington University; Dr. Frank Sewall, 1618 Riggs Place, Washington, D. C.; Professor Stephenson Smith, Hampden-Sidney College; Dr. Thom A. Williams, Washington, D. C.; Professor T. J. Woofter, University of Georgia.

The report of the Treasurer, presented to and approved by the Council, showed a balance on hand of \$62.54.

#### ABSTRACTS OF PAPERS.

*The Waning of Consciousness under Chloroform.* ELMER E. JONES.

No experiments upon the waning of consciousness under anesthetics have been made for the reason that patients who submit themselves to the operating table are usually in no psychological condition to make introspections.

In obtaining the following results the subject was chloroformed twice for the special purpose of making introspections. Special arrangements were made to observe the waning of the various senses, and also the deeper processes such as imagery, memory, reasoning, etc.

Senses disappeared in the following order: hearing, touch, kinesthetic sense, and vision. After all senses were damped down it was still possible to image, to remember, and to carry on reasoning processes. Ideas the most deepseated are the last to disappear and included such concepts as home, God, heaven, childhood, etc. These ideas appear to disappear spatially—that is, they appear to grow smaller and smaller, farther and farther apart until they are infinitely separated and infinitely small. At this point consciousness is nihil.

*The Pictorial Representation of Distance.* ROBERT M. OGDEN.

(This paper appears in full in this issue of the PSYCHOLOGICAL BULLETIN.)

*An Experimental Study of the Efficiency and the Development of Memory in Children.* Psychological Laboratory of the University of Illinois. Communicated by J. W. BAIRD.

The investigation aimed to determine (1) What is the relative efficiency of the various types of memory (or imagery), and (2) What, if

any, progressive changes occur in the dominant type of imagery peculiar to a given individual during his passage through the schools and the university (or, Do the prevailing methods of instruction and acquisition or other causes tend to develop any particular type of imagery more than any other type?). In addition to finding at least a tentative answer to these two queries we discovered that several interesting and unexpected by-products of the experimentation came to light during the progress of the investigation.

The method consisted essentially in presenting various sorts of material under varying conditions of presentation and of distraction, with a view to determining not only the efficiency of recall in each individual, but also the method of recall employed in each case. It should be added that recourse was also had to introspection and to observation of motor reactions—all of which gave a clue to the nature and variety of imagery present during recall. A series of nonsense syllables was presented at the beginning of the sitting, the subjects being permitted to employ whatever mode of learning and recall they chose; and to rule out the influence of novelty and habituation this same procedure was repeated at the close of the sitting. The average amount recalled in these two cases was taken as an index of the individual's memorial efficiency. After the initial series, other material—nonsense syllables composed with various purposes in view, other meaningless symbols, spatial relations, etc.—was presented; and in the successive presentations the various memorial factors were inhibited or emphasized by the introduction of motor distractions and other devices. Certain of these series were such as to be more readily recalled by individuals of one mental type, certain of them by others; hence a comparison of the relative success attained by a given individual in the various series furnished a basis for the identification of the type to which he belonged.

Finally we read a story which had been composed with a view to the direct appeal to various sorts of imagery. The interval which elapsed between presentation and recall varied in the various cases from a few seconds to hours and days. The experiments were carried through with approximately 100 individuals in each of thirteen grades of the school system. The results may be summarized as follows:

1. The memorial type changes, during the thirteen grades, from a strongly visual type in the fourth grade of the public school, through the motor type about the sixth grade, to nearly a balanced type about the eighth grade, and back again to a dominantly visual type at the university age. There is however a marked difference between the

earlier and the later visual types. The former is mechanical, perceptive; the latter is relational, apperceptive. The former remembers meaningless characters; the latter retains syllables, etc., but not meaningless symbols.

2. The efficiency varies with the memorial type. The most efficient memories are found where the motor imagery predominates.

3. The image fades most slowly at about the sixth grade, most rapidly in the third and fourth grades and in the university classes.

4. The conclusion of Ebbinghaus—that more is forgotten in the first few minutes after learning than during the next succeeding month—was not supported by our experiments. Paradoxically enough, it frequently happened that less of the nonsense syllables could be recalled immediately after presentation than could be recalled twenty-four hours later. (Cf. the phenomenon of retrogressive amnesia.) This delayed crest of the memorial curve was also characteristic of recall of the meaningful material. For example, with pupils of the sixth grade the curve does not reach its maximum until twenty-four hours after the presentation (of the story); in the university classes a similar shifting of the maximal point also occurs, but decline begins before the lapse of twenty-four hours.

*A Telepathic Experiment.* (By title.) HAYWOOD J. PEARCE.  
*Universal Imperatives.* J. F. MESSENGER.

There are two kinds of universal imperatives, (1) those of special application such as the commandments of the decalog, (2) those of general application such as Kant's categorical imperative. Those of special application are to be followed in the majority of cases but not in all. They guide aright just as instinct guides aright in the great majority of cases, but there are times when an animal meets destruction by following the instinct of self preservation. Conscience is a kind of higher instinct which prompts to action just as other instincts do, but it is entirely unspecialized and indefinite, and needs reason to aid in its specialization. It is the function of consciousness to guide and sometimes overrule instinct. It does this by judging each case upon its own merits instead of following blindly an established principle or custom.

A universal imperative is nothing more than an exhortation to use good judgment. It attempts to secure this by laying down a universal principle. This does not provide for progressive development. The following formula would serve as a test of real judgment and would also provide for changing the will to meet changing conditions: In any particular case act so that you firmly believe that a being whose

knowledge of the situation is complete and whose judgment is infallible would approve of the action. Such a being may be thought of as God or a hypothetical being may answer the purpose.

*A Comparison of Spinoza's 'Ethics' and Spencer's 'First Principles.'* EDWARD H. GRIFFIN.

One having in mind the differing antecedents and prepossessions of Spinoza and Herbert Spencer would hardly suppose that any relation of consequence could be established between them. The resemblances and differences are, however, of no little interest and importance. As there is no allusion to the author of the *Ethics* in Mr. Spencer's *Autobiography*, or in any of his writings, the supposition of influence exerted by the earlier thinker upon the later is excluded.

The criterion of truth recognized by both thinkers is the same — the inconceivableness of the opposite. Many statements can be found in the *First Principles* which reiterate the well-known saying, "He who has a true idea knows that he has a true idea, and cannot doubt the truth of the thing perceived."

An absolute, self-existent whole or ground of being, as a metaphysical belief, which has no warrant in the senses, or in any association of sense data, — in this assumption the two systems agree.

This principle 'omnis determinatio est negatio' is employed by Spencer to justify his conclusion that 'the power which the universe manifests to us is utterly inscrutable.' The criticism in the *First Principles* of the category of personality as applied to God is only a rendering into modern language of the objections urged by Spinoza.

The negative and abstract conception of Infinite Substance, which seems to be set forth in the *Ethics*, and which is the accepted doctrine of the *First Principles*, is not, however, the real meaning of Spinoza. His whole ethical theory would be rendered futile by such a view. His 'Substance' is not the logical abstraction 'being'; it is rather the sum of things comprehended in a vast unity. The religious motive in the *Ethics* is to be recognized. It is only as we come to know God that we are set free from the illusions and tyrannies of desire and fear; if God is unknowable, this escape from bondage is impossible. At this point we find an antithesis instead of an agreement.

Spinoza's reply to the question why we know only two of the infinite number of attributes, acknowledging that an *a priori* deduction is impossible, is in agreement with Spencer's account of the differentiation of experience into *object* and *subject*.

In both systems an unbridged chasm is left between the infinite and Unconditioned Reality and the finite world of limit and change.

The parallelism between the physical and the psychical, as described in the *Ethics*, is reproduced, in the main, in "the antithetical conceptions of Spirit and Matter, to be regarded as but a sign of the Unknown Reality which underlies both."

As Spinoza does not succeed in preserving the equipoise between the corporeal world and the world of thought, being led unconsciously to give precedence, now to the one set of modes and now to the other — in order to provide for sense perception and for self-consciousness — so Spencer, while protesting the contrary, inclines the balance decisively on the physical side, since all the forces in the ascending scale — physical, biological, psychological, social — are reducible ultimately to matter and motion.

There are several points of resemblance of a psychological character.

The nature of the human mind is conceived similarly in the two systems, the conception being that of Hume, 'a heap or collection of different perceptions.'

The continuity of consciousness is not adequately explained, being left unaccounted for in the *Ethics*, and being referred, in the *First Principles*, to the body and its functions.

Spinoza and Spencer agree in looking upon free will as an illusion, and in explaining the mistake as due to our ignorance of the causes whereby actions are determined.

Each system offers a reconciliation between the self-regarding and the altruistic impulses.

The construction of a doctrine of Ethics is the main concern of both thinkers. One solves the moral problem after the manner of Socrates and the Stoics, his theory being the apotheosis of knowledge. The other derives conscience and moral feeling out of animal impulses, presenting the impressive idea of a law of conduct attained as the last result of a study of the process of evolution. Both give Ethics a cosmic basis.

Although Spinoza has often been stigmatized as an atheist, and his system directly negatives the cardinal affirmations of theism, the *Ethics* has had a powerful attraction for many noble and devout souls and contains many essentially religious sentiments and ideas. The *First Principles* is lacking in ideality, and gives little scope for the religious imagination.

The comparison, outlined above, may be carried down to minute details of phraseology, revealing many curious correspondences of language as well as of thought.

*Inspiration from the Point of View of Psychology.* GEORGE L. RAYMOND.

When men use the term inspiration, they refer to a supposed inner, as distinguished from an outer, influence exerted upon the mind irrespective of that coming through eyes or ears. The fact of such influence and its effects on expression can be proved by hypnotism. The method of exerting hypnotic influence is through suggestion, and no two, when hypnotized by the same person, express themselves in the same way. The way depends upon the previous experience, information and associations constituting the contents of the subconscious mind of the one hypnotized. According to the analogy of hypnotism inspiration, therefore, does not interfere with the expression of personality and originality, but promotes both. In hypnotism, though under control in one sense, a man, by giving expression to his unconscious nature, is revealing that which is peculiar to himself. Prophets and poets exert as great individual as inspirational influence. This individual influence, being determined by that which has been stored in their minds, may be erroneous, yet the general trend of their influence truthful. The results of inspiration in different ages and countries have the same source and character as those of conscience. They are conditioned by that which is stored in the mind influenced. As the promptings of conscience or the dictations of those who are conscientious cannot be rightly accepted, either by the agent of the influence or the subject of it, without an exercise of intelligence and of rationality, so with that which comes from inspiration. Indeed, considered merely as modes of expressions, all movements and words are taken from external nature, and are not reproductions of thoughts but suggestions of them. This fact is shown by the use which we make of gestures, words and combined words as in certain quotations made from Shakespeare. In conclusion, it was pointed out that anything like inspiration which affects first the subconscious nature for the purpose of stimulating the conscious nature to thought and action is very different from information which affects first the conscious nature. Inspiration, as in art and religion, merely gives thought a push or inclination in a certain direction. Information, as in science or history, registers and reports exactly the position which thought has reached. The criteria of the two forms of truth therefore differ essentially. To get the truth out of the passages quoted from Shakespeare—and the same would be true of passages from the Bible—we must be very careful not to interpret them literally but suggestively. To get the truth out of any statements of science or of history, we must be careful to do the opposite. They must be interpreted literally.

*The Teleological Judgment.* EDWARD E. RICHARDSON.

This paper was prompted by the impression that I first received in reading the *Critique of the Teleological Judgment*. I have read and re-read this critique since that time, yet the first impression which I received has not only remained, but has been strengthened.

Following some preliminary remarks concerning the actual presence of judgments of purposiveness in experience, the paper proceeds to a statement of the Kantian position as concerns this principle in question. The statement is here made that the Kantian definition or position as regards purposiveness on its subjective side is practically a truism.

The paper then considers the meaning of finality as used by Kant when reference is made to objective purposiveness. The point is made in this connection that Kant used the term purposiveness in his objective reference to the term in slightly different senses in different places in this critique and that it was on account of subtle distinctions in the use of this term that Kant has unconsciously fallen into error as regards the conclusions that he finally reaches.

The limits which the preceding critiques had set could not be overstepped by Kant and consequently he was compelled to move within the limitations that he had himself previously imposed. It would appear from an examination of the *Critique of the Teleological Judgment* as if Kant was almost at times inclined to give more ontological significance to this principle of finality and yet just as he is about to do this the turn of the argument backs to the opposite position. Reference is made here to Kant's conception of nature and the influence that this has upon his doctrine concerning final causality.

The Kantian discussion concerning the incomprehensibility for us of the whole preceding the parts but that the parts must precede the whole is considered at some length. The point made here is that Kant's contention in this particular connection is a double-edged sword that cuts one way as well as the other, and the Kantian argument is accordingly vitiated.

The statement made in the critique under consideration, that the investigation of nature *can* and *must* be conducted according to the principle of purposiveness receives some attention in the paper. Some additional reasons, and the implications involved therein, whereby Kant took the position that he has in this critique are considered in the concluding part of the paper, as well as is also the final agnostic position of Kant as regards the purposiveness of nature.

The paper closes with a few general remarks concerning the philo-

sophical value of the Kantian critical philosophy and the writer believes that, while epoch-making for philosophy, it can be shaken in part at least and that the true standpoint is to be found in getting *beyond* Kant, not however by going *around* Kant but by going *through* Kant.

*The Aesthetic Experience: Its Nature and Function in Epistemology.* W. D. FURRY.

The increased æsthetic discussion of the past century rather set the problem of æsthetics than solved it. As in the days of Fechner so now æsthetic theories are either 'from above or from beneath.' With the recognition of two distinct types of interest, the theoretical and the practical, have come the attempts to subordinate the æsthetic experience with the one or the other. That the æsthetic experience has played some part in the more serious business of life is generally recognized, so that the time is gone when the æsthetic can be disposed of either by making it a sort of appendix to text-book of psychology or a mere footnote to a system of philosophy.

The primary and fundamental æsthetic inquiry is as to whether the æsthetic experience can be subordinated to either of the two recognized types of experience or whether it represents the rise and development of a type of interest which exists for its own sake rather than for some ulterior end. The conclusion of the paper was that to reduce the æsthetic experience to either of the two types of interest is to reduce the æsthetic to the limitations and embarrassments from which it seeks to disengage itself and by the very process of this disengagement is fitted to unify and complete the otherwise fragmentary and mediate character of the theoretical and the practical life alike.

It was shown in the paper that the æsthetic and the epistemological have arisen together; that each has passed through a series of modes of development, all of which may be reconstructed with a tolerable degree of accuracy; that the character of the epistemological reflects always the character of the æsthetic at the corresponding period; hence the conclusion was reached that the burden of the epistemological became always the opportunity of the æsthetic. As Kant long ago pointed out neither the theoretical nor the practical reason can complete itself. Thought is always dualistic and as Bradley says can never harmonize its own content and will always involve a struggle between reality as it is and as we are striving to make it. Both types of experience require a fuller and more complete experience in which thought and conduct alike are unified and completed. The setting up of such an experience without breaking with experience represents the epistemological problem at any stage of mental development. The several

attempts to solve the problem thus stated end in mysticism, meaning by mysticism a return to a more primitive experience in which the later dualisms of thought and conduct have not yet come. But the setting up of such further experience, the discounting of future experience by schematically treating present meanings as meaning more, in which consciousness finds its static relations vital and fruitful and its dynamic, moving experiences truthful and meaningful, is found to be the function of the æsthetic.

*The Present State of Logical Theory:* President's Address by J. MARK BALDWIN.

Devoted to an exposition of the present tendencies away from formal logic, namely: Apriorism, Immanentism, Instrumentalism.

1. The reaction in the direction of Apriorism in Germany, as seen in Husserl and Meinong, was criticized from the psychological and instrumental points of view. The artificiality of reserving the 'logical' or 'discursive' type of operations from the principles of continuity and utility which apply to the genesis of cognitions of other types, was pointed out.

2. The Immanentism of Cornelius, Rehmke, and others was in turn criticized, the principal objection to it being that it makes 'experience' a closed and 'immanent' process and so finds no trans-subjective factor. On such a view — together with that of 'pure experience' — the factor of 'foreign control' is overlooked, and a form of individual experience postulated which makes 'common' and 'universal' knowledge impossible.

3. Instrumentalism was advocated based on genetic considerations. A theory was sketched — developed in the speaker's work *Thought and Things*, vol. ii — which issues in two positions. First, the essential commonness or 'community' of all logical process was pointed out, privacy and singularity of judgment being considered as derived and special rather than original modes, and second, the intent of further 'proposal' or 'hypothesis' — an imaginative intent — was found to attach to all truth and logical implication, even the most abstract and universal 'laws of thought.'<sup>1</sup>

4. The general conclusion was reached, however, that instrumentalism and rationalism are both incomplete since they are complimentary aspects of the whole logical movement. As instrumental, knowledge is a means not only to practice, to action, but also to further knowledge, to a systematic body of reality. Further, the dualism of

<sup>1</sup> See the author's exposition of his view under the contrast between 'knowledge' and 'imagination' in the PSYCHOL. REVIEW, May, 1908.

controls issues in two modes of the real—that of things or truths and that of ends or worths. The *assumption* of worth or the ideal requires the *presupposition* or *presumption* of fact or the actual. The issue is found in the synthesis of the two in the type of *immediateness* seen in æsthetic Einfühlung or contemplation which is available as an epistemological no less than an æsthetic category. In it the instrumental or imaginative meaning and the ‘actualizing’ or truth-finding meaning come to unity in an immediate ‘realizing’ which *in type fulfils them both*.

*Discussion: The Present State of Logical Theory.*

CHRISTINE LADD FRANKLIN.—Origin and Functions of Symbolic Logic.—Symbolic Logic sprang ready-made from the brain of Boole in 1854. Its problem is the formalization of formal logic. Formal logic, in order to keep clearly in mind the fact that, in reasoning, the meaning of terms is without significance, symbolizes them by means of non-significant letters of the alphabet. This indispensable aid to abstraction was devised by Aristotle. The world had to wait long before the next step was taken—Leibnitz, Lambert, Ploucquet, foresaw the need for it, but Boole first actually solved the problem of laying down the rules for the unthinking (and hence the unerring) treatment of these additional logical elements: (1) The simple relations between terms and combinations of terms (those in *is* and in *it follows that*) ; (2) the three functions of terms (aggregation, determination and negation—*and*, *or* and *not*) ; (3) the two special terms (the only terms which are *not* without significance—*everything* and *nothing*, or the *existent* and the *non-existent*—symbolized as  $\infty$  and  $0$ ).

In other words, the logic of Aristotle was the logic of *all* and *some*—Boole added the logic of *and*, and *or*, of *everything* and *nothing*, and of the generalized relation of ‘*sufficient condition*’ (*is, follows*). The use of symbolism is an invaluable but not an indispensable aid in this conquest of new fields.

But Boole followed, mistakenly, too closely, the models of elementary mathematics (the relation of equality, even of equality to zero, has nothing to do with pure logic). His actual methods have been entirely superseded by those of Schroeder and of Peirce and his school.

The function of symbolic logic at the present time is :

(a) The rigid examination of the fundamental principles (axioms if universal—postulates if particular and therefore affirmative of existence) on which any largely deductive science is based—and notably those on which logic itself is based. This involves the absolute guarding against the slipping-in, in the course of the reasoning, of any

intuitions which have not been admitted explicitly. The elementary geometry of Euclid, supposed to be the very model of scientific rigidity, is found by such means as these to be riddled with inadvertencies.

(b) The mechanical handling of any number of concurrent premises in any number of terms — the elimination from them (with absolutely no other loss of truth) of any term or terms in regard to which information is not desired, and the expression of all the truth that remains in the form of a complete predicate to any desired subject.

(c) The working over of mathematics especially with the aid of this immense tool towards accurate thinking — the mathematization of mathematics. In the hands of Peano and his school in Italy, Bertrand Russell in England, and Couturat in France, most important results are promised in this field.

MORITZ GEIGER (of the University of Munich, by invitation of the Council).— The Status of Logic in Germany.— The conditions of logic in Germany to-day are quite different from the conditions of logic in America. In the last thirty years pure formal logic has occupied only little interest among German philosophers. The preponderance of psychology has been decisive in the treatment of logical problems. The so-called formal logic was very often influenced by psychology, or the psychological discussion of logical concepts pushed away the mere logical problems (Sigwart, Erdmann, Wundt). The reaction against the so-called ‘psychologism’ came from different sides : The Neo-Kantians, chiefly interested in the problems of the categories, emphasized the transcendental method (Cohen, Natorp, Windelband). Meinong, from another side, built up his new science, ‘Gegenstandstheorie,’ not as a part of logic, but as a theory of the objects as objects, which does not speak of any particular objects, neither of those of natural science, nor of mathematics nor logic.

The standard work of the anti-psychological logic is Husserl’s *Logische Untersuchungen*, which, in the first volume, gathers the arguments against every kind of psychologism, and, in the second volume, seeks the way to a new theory of truth and evidence. Finally, the mathematicians (Frege) reorganize the pure logic in the form of symbolic, algebraic logic.

To all these different movements is common that they maintain that the laws of logic are ‘a priori’ and necessary, that these laws are not the laws of a thinking mind, but laws of objects ; that logic is as independent of psychology as is, for instance, mathematics.

Instrumental, psychological, genetic logic is (for Germany), therefore, not a postulate, but the reigning theory, against which new movements try a renaissance of pure logic.

## THE PICTORIAL REPRESENTATION OF DISTANCE.<sup>1</sup>

BY PROFESSOR ROBERT MORRIS OGDEN,  
*University of Tennessee.*

The most important factors contributing to the formation of our judgments of visual space may be conveniently summed up under four heads :

1. Body movements which condition parallax.
2. Eye movements of accommodation of the lens and of convergence of the axes of the two eyes for different distances.
3. Stereoscopic vision, depending on the scheme of relative displacements with respect to a variable horopter — these displacements being in the right eye to the left and in the left eye to the right of the point fixated when the object is *nearer* than the horopter, and, conversely, in the right eye to the right and in the left eye to the left when the object is more distant than the horopter.
4. Pictorial details which may be analyzed into :
  - (a) Geometrical perspective, or the regular decrease in the size of objects as they recede.
  - (b) Aërial perspective, or the alterations in contour, color tone and brightness which, because of atmospheric effects and the limitations of clear vision, an object must undergo at different distances.
  - (c) Shadows cast by objects on themselves and on their surroundings.
  - (d) Color and brightness contrasts which hold apart objects having different shades and hues.
  - (e) The superposition of objects indicating their order of remoteness.

A cursory glance at the above groups will reveal certain important facts for our consideration. It will be at once noted that the first three groups of factors are better adapted to indicate *solidity* than *distance*, since they have significance only for objects relatively near at hand. We alter our position in order to comprehend more clearly the spatial nature of an object which is within a few feet of us. We do not do this when the object is at a distance. A mountain seen at different

<sup>1</sup>The following remarks were suggested largely by the treatment of the subject in Adolf Hildebrand's *Problem of Form*, forthcoming Eng. tr. by Max Meyer and R. M. Ogden; G. E. Stechert & Co.

angles is apt to present such varying aspects as to make it difficult for us to identify them. The views remain visually distinct pictures of different localities even though we may know it to be the same mountain in each. Not so, however, when the object is near us, different views are then readily referred to the same object, and thus contribute greatly to our knowledge of its true spatial nature.

At a certain distance from an object eye movements cease to play a part in our judgment of its spatial nature. As distance increases, accommodation, which is very active in adjusting for objects near at hand, becomes more and more a negligible factor. So too with convergence, the angles vary greatly for objects near by, whereas for remote objects the variation tends slowly towards parallel axes. As to the purely visual concomitants of these angular adjustments of the two eyes, the considerable disparity to be noted in the pictures on the two retinae when the objects judged are near, becomes gradually lessened as they recede until, finally, the two pictures are identical.

We may say, then, that as objects recede they make constantly decreasing demands on us for movement. Instead, a relatively fixed and constant adjustment is requisite, and the retinal pictures, though tending towards vagueness, show no disparity.

With respect to the fourth group of factors it is quite a different matter. We have here to do with purely pictorial details operative at any distance without regard for body movement, eye movement or stereoscopic vision. But it will also be noted that while these factors, coöperating with those of the first three groups, contribute largely to our knowledge of near-by objects, they become the most important instruments for conveying to us knowledge of distance.

Applying these facts to pictorial representation we may raise the question as to the verisimilitude of this form of art in reproducing nature. But, first, let us inquire briefly as to the function of pictorial art, that is, of designs and representations on flat surfaces. I think we may say that art of this sort involves variously, and in different degrees of relationship, three prominent elements :

1. Representation, or the transference of the three-dimensional object of nature to the two-dimensional area of the picture.
2. Decoration, or the grouping of lines and areas, colored or neutral, with regard for their quality, symmetry, proportion and contrasting effects.
3. Interpretations which may be consciously read from, or unconsciously suggested by the pictorial factors.

The first of these elements demands a clear spatial impression

which, if it does not possess the complete verisimilitude of nature, is, nevertheless, sufficiently complete to make the representation intelligible and devoid of conspicuous flaws.

The second element works with representative art as a pleasing by-product and general unifying principle. It also has independent existence as applied to architecture, tectonics, etc.

The third element consists of interpretations, both physical and mental, which the above elements may suggest. To gain its peculiar ends the normal usage of representation and decoration may both at times be held up, verisimilitude and beauty of design being neglected for a relative crudity which, however, because of the parsimony of the attention process, is able thus to symbolize more completely a psychological message. The various phases of this element are much too detailed to be considered here. But needless to say the element is always involved in some degree, whether constrained by the picture or transcending it with relative freedom; whether involving conspicuous physical activity or relative quiescence.

In the present paper we have before us for our principal consideration the verisimilitude of pictorial art in the representation of distance. We shall therefore neglect the decorative and interpretative elements in the main, though both are in reality constantly playing their parts in the whole.

Unless a picture is purely decorative, or purely symbolic, or a combination of the two, the representation of space must play an important rôle in its composition. The question then arises, how can space be represented on a two-dimensional plane without the disturbing effects which a sense of unreality must necessarily bring.

The question is answered, I think, by laying stress on distance rather than on the plastic quality to give a sense of unifying space to the representation. As has already been noted, our ideas of the plastic nature of things are primarily derived from movement and a succession of perceptions. Both are excluded from pictorial representation. On the other hand our ideas of distance are most truly represented by the pictorial details at our disposal, since it is just in these terms that we view distance in nature.

But in attempting to reproduce things seen at a distance we are still involved in certain discrepancies. Among these there is our inability to render with pigments the absolute color and brightness values of nature. Although this is a real difficulty, it is not so great a one as might be supposed, for the reason that our memory for absolute values appears to be so slight that if the artist has made a judicial selection

of his dominant coloring, and a clever use of contrast to set off his colors and high lights, we fail to detect any marked discrepancy.

Another difficulty arises from the fact that, although representing things under the conditions of a distant view, the artist nevertheless brings them often much nearer to us than the optical conditions would seem to warrant. This discrepancy is frequent in art, yet it too can be made to pass unnoticed. Indeed, the difficulty arises only when the picture strongly suggests plastic solidity, in which case the observer is placed in a similar position to one who views a panoramic arrangement and is compelled to accept a false arrangement of plastic and pictorial details without being able to detect just where the falsehood lies. In order to avoid this conflict with ideas of plasticity which demand stereoscopic vision and movements which manifestly cannot be supplied, it is incumbent upon the artist to emphasize distance and keep his nearby objects well within the frame of the picture. By properly placing the objects of main interest, it is possible to emphasize a backward rather than a forward tendency in the picture, and thus lead the observer's gaze quickly into the distance where the demands of plasticity are not felt. This emphasis of the distance effect is produced principally by aërial perspective, and by the massing of objects into planes which are set off from each other by superposition and contrast quite as are the masses of hills at different distances in nature.]

This spatial effect of distance through the conception of contrasting planes is emphasized and made unusually apparent by stereoscopic pictures. The exaggerated effect which is here produced accounts at once for the compelling sense of space which we have, together with the apparent artificiality of the stereographic effects.<sup>1</sup> Pictorial factors plus displacement work together in this instance to give an impression of space which depends rather upon the over-emphasis of distance than upon those truly plastic factors which would be involved in viewing the same scene in nature, *i. e.*, eye movements of accommodation and convergence. For it is easy to observe that a stereoscopic picture presents a more or less definite succession of planes rather than a perception of solid objects. The reason for this is that the displacements are so much more effective between objects at different distances than they are between parts of the same object that the latter become practically negligible. In nature, on the other hand, when we see these

<sup>1</sup> Münsterberg has pointed out another discrepancy in comparing the sweep of the eye over the plane of the stereograph with the corresponding movement when viewing nature, which also contributes to the relative unreality of the results obtained with the aid of stereoscope or 'verant.' (*Journal of Phil.*, I., 23, pp. 617 ff.)

same objects from the same position, eye movements are constantly brought in play, and the transition from one object in space to another at a different distance cannot be simply jumped over as it is when eye movements are lacking. Hence the unreality of stereoscopic pictures and the effect obtained as if the masses of objects were merely separate flat planes set up at different distances like stage scenery.

In art these planes are contrasted by means of purely pictorial details, and no discrepancy need be felt unless the object is made to appear so near as to demand the physical accompaniments of judgments of plasticity. Such demands are avoided principally by the treatment of the vista which may be made quite natural. Aërial perspective also aids in suggesting the distance view. In case the vista is lacking, as it frequently is in interior views and portraits, the same backward tendency of the planes may still be preserved to give a clear spatial perception which is usually surcharged with psychological meaning. The significance of the distance, however, must be weakened in these views, and the tendencies toward too great a plasticity are correspondingly increased. All the skill of the artist is involved in solving such problems as these. Our interests in a picture are diversified, but the artist may suggest along what lines our thoughts shall travel. Thus it is that he distracts us from the deficiencies, and forces our attention on the superiorities of his art. The natural demands for verisimilitude are not demands for slavish imitation, but neither may the normal conditions of perception be neglected. It is a matter for the artist to determine what interests shall dominate. But he must then take care that all suggestions of unreality be avoided, or at least subdued and so rendered innocuous.

## PSYCHOLOGICAL LITERATURE.

### JUDD'S PSYCHOLOGY.

*Psychology; General Introduction.* CHARLES HUBBARD JUDD,  
Professor of Psychology and Director of the Psychological Laboratory at Yale University. New York, Scribner, 1907. Pp. 382.

This book is announced as 'volume one of a series of text-books designed to introduce the student to the methods and principles of scientific psychology.' The author lays stress upon four features: first, that his treatment is functional rather than structural; second, that it is genetic; third, that the physiological conditions of mental life have been given conspicuous emphasis; and fourth, that proper significance has been given to ideation as the 'unique and final stage of evolution' and the most striking fact in mental development.

Following the introduction are two chapters dealing with the nervous system, one tracing its evolution at large, the other describing the human nervous system in more detail. The first of these chapters will be valuable for the student, the second is less clear and likely to prove difficult. These chapters are illustrated by some twenty cuts, many of which are, however, like those elsewhere in the book, too much reduced in size to serve their purpose well. One notes here, too, an indiscriminate use, now of English, now of metric units of measurement.

The general analysis of consciousness (ch. iv.) is brief, but important because it gives the cue to the development of Judd's system. Five main types of conscious processes are distinguished, viz.: sensation factors, relations between sensations (perceptual fusions), attitudes (including feeling, interest, and attention), memory contributions, and ideational relations.

The treatment of sensation (ch. v.) is characterized by insistence upon the distinction between physical, physiological, and psychological processes. It seems to me that this distinction is rendered needlessly difficult, and that a correspondingly needless time is consumed in its clarification. A number of dubious or incorrect statements may be found in this chapter. For example, it is stated that the color-blind see violet as violet (p. 91); contrast is erroneously attributed to after-images (p. 97), and no effort is made to show the relation between

after-images and adaptation. The color circle (p. 77) is certainly inferior to the color pyramid as a representation of visual qualities. Middle c of the piano is said to have 512 double vibrations per second (p. 103) but is correctly given as 256 later (p. 114); noise is explained as due solely to complex vibrations (pp. 104-5); each member of a tonal complex is declared to retain its independent value for experience in contrast to the fusion of colors (p. 113); beats are said to be heard in addition to the two fundamental tones (p. 113); difference-tones are explained simply as beats too numerous to be separately apprehended (p. 114); tonal deafness is apparently confused with the phenomena of tonal 'gaps' and tonal 'islands' (p. 115); pain spots are 'defined as specially sensitive pressure spots' (p. 124), while the evidence for specialization of end-organs in the skin is declared not to be conclusive (p. 126). Again, the dismissal of the important group of subcutaneous sensations in a portion of one paragraph (p. 126) with the statement that 'in the normal course of life they come into experience with a great mass of skin sensations,' and that 'they never are intense except when they are abnormal' does scant justice to the contributions of sensation from the tendon and the joint; so, too, the analysis of the factors which enter into tactual space percepts (p. 142). Introspection would, on the contrary, lead one to see in these sensations an important element in tactual space and the source of many of the 'attitudes' which are so prominently featured in Judd's treatment.

Chapter vi., which discusses the functional relations between sensations (really the perception of space and time), is one of the most interesting in the volume. Judd's fundamental principle is that one must always distinguish between a sensation and its function; that the function of a sensation 'can be defined only by considering the use to which the sensation is put' or the 'relation into which the sensation enters'; that 'these relations are just as much a part of experience as the sensation qualities.' The relations between sensory qualities are termed 'fusions'; the relations of sensations to activities are termed 'attitudes.' Henceforth, these attitudes loom large, so much so that consciousness is said to be 'characterized chiefly by the attitudes of which it is made up, sensation serving merely to initiate these attitudes' (p. 135). In what sense the perception of objects can be said to be an instance of fusion while the constituent tones in a chord can be said not to fuse (p. 113) is difficult to understand. The balance of the chapter traces the organization of the more important perceptual fusions, viz.: tactual, auditory, and visual space, the unity of objects, and time. In-

cidentally, I note that the point system of writing for the blind is seemingly regarded as a recent invention (p. 141); but Braille had perfected it in 1835.

This discussion of the organization of sensory experience into functionally operative complexes would, in my opinion, be much clearer if it were prefaced by a development of the principles of retention, attention, and association, and of the nature of centrally excited sensations (memory images). Throughout the chapter, one can scarcely avoid the feeling that Judd, while seeking to avoid an explicitly structural treatment, is making extensive use of introspective analysis of the structural type. A similar comment may be applied to other sections of the book.

I find, personally, great difficulty in understanding how sensation qualities constitute only the content of experience, while a large part of conscious experience is formed merely by the forms of functional relation, contentless attitudes, etc.

Factual statements of doubtful character are that sensory impulses from the semicircular canals enter every perceptual combination (p. 171), and that a uniform sound 'will be broken up into a succession of rising and falling accents by the listener himself' (p. 177).

The peculiar interest of chapter vii. (*experience and expression*) lies in its description of attention, feeling, and emotion as functional attitudes. An attitude is not a sensation, in Judd's system, but one's reaction to the sensation; the term is to be applied 'to both the bodily reaction and the mental process' (p. 188). The immediate conditions of attitudes are found in 'the central processes which determine the motor discharges into the muscles' (p. 188). Attention, which is 'the most general attitude in mental life' is an individual attitude, not determined by external conditions, not a new factor or content or form of arrangement in experience (p. 189), but 'merely a name for various phases of selective arrangement within experience' (p. 193). It is an attitude 'of concentration upon certain factors of experience and rejection of others.'

"Feelings are unique phases of experience which depend for their character upon the congruity or incongruity of the different active tendencies of any given moment; they are attitudes, never to be confused with contents" (p. 202), and are not, as in the Lange-James theory, related to sensations of movement (p. 195). Disagreeable feeling is due to a conflict of motor tendencies; pleasurable feeling to coöperation of motor tendencies (p. 197). Here, again, the formulation can be acceptable only to one who can envisage the process by which a

conscious experience may arise, without content, merely from the existence of conflicting or non-conflicting motor tendencies.

The development of the direct forms of consciousness is concluded in an interesting chapter on instinct and habit. Here the concept of organization, implicit in the preceding discussion, is given explicit treatment, and, in Judd's hands, becomes thereafter a principle of far-reaching application. This use of organization seems to me one of the most valuable features of the book.\* Organization appears primarily in 'coördinated activities of the muscles, provided for in the inherited structure of the nervous system,' *i. e.*, in instincts. Further organization appears in the formation of habits. Habits spring from two main sources, ( $\alpha$ ) out of instincts themselves, especially from the selection of conflicting instincts or the modification of instincts in the light of experience, ( $\beta$ ) out of a condition of unorganized 'diffusion' through the selection and combination of successful elements of movement, *e. g.*, in learning to write. The question naturally arises: what determines this selection? Judd argues that the selection is not determined, as commonly asserted, by pleasantness-unpleasantness, since this is not a cause but a result of organization. But he does not indicate very clearly just what does determine the organization, save to attribute it to 'success,' 'attainment of end desired,' 'adaptation,' 'advantage,' or meeting stimulation 'in a way which is natural and compatible with the total organization of the individual.' If the concept of 'need' were more elaborately developed, it might serve a useful purpose in this discussion. In the illustration (p. 217) of conflicting instinctive tendencies, it seems to me that curiosity is a much more likely antithesis to fear than is the instinct of social contact.

With the discussion of memory and ideas (ch. ix.), including the function of memory images, we are introduced to what Judd terms the 'indirect' phases of experience and forms of arrangement. The laws of association, the nature of retention, and the possibility of memory training are treated incidentally in this connection. The most important contribution here seems to me the development of the relation of memory images to the organized forms of response. Judd shows clearly (p. 239) how memory images supplant perception as a guide of behavior, and how these memory contents 'degenerate,' if I may use the term, with use, and finally disappear entirely when habit is established. "Content is here used for a time in building up a habit and the content is dropped and the function is retained" (p. 240). Such organized habits of response are very difficult to modify or reorganize, hence the conservatism and stability of our individual attitudes toward the more familiar experiences of life.

By a similar line of argument, the author finds the 'meaning' of words (ch. x.) to consist far more in the attitude which they arouse than in the imagery which was possibly associated with them when first acquired. "The content of experience arises rather from the total phrase or sentence" (p. 267). "General ideas are in essence nothing but dispositions toward activity" (p. 268). Such a disposition usually lies "in a bodily movement which is a much reduced resultant of earlier direct attitudes" (p. 269). "Ideas are the characteristic marks of the human type of life and development" (p. 273).

Imaginations (ch. xi.) are memory images which are radically changed in process of recall. When used for practical purposes, imaginations are tested critically either by empirical methods, or, when these are inapplicable, by reference to their internal coherency. Products of constructive imagination in which the image factor has become attenuated and the relational factor all-important are termed conceptions. This close connection of imaginations with concepts has some advantages, but it seems to the reviewer to lose sight of the distinction between imagination as dealing with concrete experiences and conception as dealing with generalized experiences, or at least to confuse the student's notions of conception. Judd has done service in calling special attention to the delay in motor discharge which accompanies these higher forms of reorganization (p. 296): the simple reflex-arc concept has been too often forced to do duty as a general expression for all forms of response.

The discussion of the concept of the self (ch. xii.) is so abstruse and difficult that it is hard to see how the average student of psychology can profit from its perusal.

The earlier discussions of action are completed in chapter xiii., which deals with impulse and voluntary choice. Aside from an excellent presentation of the psychology of reaction-time, this chapter deals for the most part with the problem of determinism and free-will. While the classification of the forms of action is helpful, it is to be feared that the issue of the problem is not made very clear to the student.

Opposed to the general processes of organization, of which so much capital is made, Judd finds certain tendencies toward what he terms 'dissociation' (ch. xiv.). Under this concept are subsumed such varied phenomena as illusions, hallucinations, sleep and dreams, the effects of drugs, dual personality, hypnosis, and insanity—a collocation that appears somewhat artificial. A paragraph upon hysteria, following the lines traversed by Janet in his *Mental State of Hyster-*

*icals*, might well have been added to complete this picture of dissociative tendencies.

The final chapter deals with the applications of psychology. Reference is made to art, esthetics, literature, sociology, anthropology, education, logic, ethics, and metaphysics. The particular phases of psychological study which Judd adduces as evidence of the application of psychology to the problems of teaching are the genetic studies of individual development, the nature of habit and of the process of learning, the recognition of expression as of greater importance than impression.

This volume, taken as a whole, impresses me as an exposition of the author's system of psychology which is calculated more to interest and challenge the attention of his brother psychologists than that of his students. The author's style is expository and argumentative, straightforward, but not easy and varied enough to hold the attention of immature readers. This general impression is heightened by the closely printed pages, the rather narrow margins, the complete absence of foot-notes, analytic tables of contents, chapter-end references, suggestions for supplementary reading, or questions or topics to promote discussion. Many chapters are decidedly difficult, and in some cases the order of exposition within the chapter is confusing. Very likely these seeming deficiencies become points of merit under the instruction of so skillful a lecturer as the author, but I should personally hesitate to use this text in any but the most advanced classes of mature students. Its use, as contemplated in the announcement, as a text-book 'designed to introduce the student' to psychology will demand a high grade of student and a high grade of instructor.

From the point of view of the psychologist rather than of the teacher, I find myself highly interested in the book. I suppose no psychologist is likely to find himself in complete agreement with another's system, but in the present instance he will be bound to admire the consistency with which the author has developed his system, and will find himself forced to take the defensive whenever he fails to agree with the presentation of the book.

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## SOCIAL PSYCHOLOGY.

*Die Anfänge der Gesellschaft.* W. WUNDT. Psychologische Studien, 1907, III., 1-48.

The present article is a condensation of the material that is to form the forthcoming part of the second volume of the author's *Völkerpsychologie*. It is an outcome and a continuation of his discussion of totemism, which subject finds here a comprehensive consideration, in connection with its concomitant social phenomena.

The author is not in sympathy with the contemporary tendency, displayed also by Usener, to look upon totemism as a temporary fashion. Ethnology can not pass over lightly all the facts accumulated by competent English and American investigators, revealing a significant unanimity in the phenomena of totemism in many regions, often widely separated. It is also apparent that totemism is so closely interwoven with all phases of aboriginal social life, religious as well as cultural, that its understanding becomes necessary for a proper interpretation of all primitive social structure; above all, it should be determined concerning totemism, whether it is an outcome of certain social structures, or whether the form of organization is a result of totemistic influence. With this purpose in view the author here takes up the phases of primitive society that fall within the domain of the belief in animal ancestors and protecting spirits, and all this in unbroken connection with the external social conditions of aboriginal life.

A study of the Australian tribes, based on A. W. Howitt's work, shows a striking tendency of the tribe, or horde, to split, as a rule, into two parts, and, where a more complex division had taken place, we still see a partition based on the halving principle, so that the numbers 2, 4, 8, etc., represent the fundamental element of the Australian classificatory system. Examination demonstrates that the Iroquois of North America were subdivided, in accordance with the same halving principle, into two moieties, each one of which contained four classes and their subclasses, these divisions being designated by Morgan as phratries, gentes and subgentes. Just as among the Australians, matrimonial alliance was here confined to certain gentes. On the whole, the Iroquois show a more complex organization, which, nevertheless, appears to be merely a more extensive application of the principle of halving. Their totemistic conceptions also show a similar metamorphosis, when compared with those of the Australian tribes.

On the basis of these and also other examples the author concludes that all primitive social organization has gone through the process

of halving of the undifferentiated horde. This he accounts for by the natural mode of splitting of the original group as a result of difficulties of dwelling together, following upon numerical increase. The younger members would separate from the rest and start out in search of new hunting grounds or pastures. Following upon separation, the formerly amicable contests between the members of a group tended to take the form of more serious strife, actuated, undoubtedly, by the first requirements of a livelihood. The memory of society preserved, in a variety of ways, only one of these primitive struggles (an unmistakable sign of its fundamental importance), the contest for the possession of a wife.

The Malayan kinship system and that of primitive man generally differs essentially from that of civilized societies; our relational names cannot be found in the language of primitive man, while some of their kinship denominations are entirely out of reach of our vocabulary. The whole system of kinship-expressions among the Malayo-Polynesian races amounts only to a differentiation of the group on the basis of sex and age, coinciding with the mode of division of labor in a primitive horde, accentuated, even to the present day, by a total separation of the dwellings of the males, and by an exclusion of women from a participation in some mysteries and ceremonies. All this, however, does not exclude the existence of matrimonial regulations, which have found expression in positive normative customs, in exogamy and in marriage by capture,—this last one having degenerated into a mock-fight.

Professor Wundt rejects Morgan's explanation of the origin of exogamy by man's natural abhorrence of incest, supposedly based upon an instinctive fear of its detrimental physical and moral consequences; such an abhorrence can not be found among several South American and Malayan tribes. It seems more probable that the repulsive feeling now prevalent resulted from a long existence of exogamy, and not the reverse. MacLennan's view, accounting for the rise of exogamy and for marriage by capture by an insufficient supply of women, seems also inadequate, as the agreement at the basis of exogamy surely presupposes that each matrimonial group had enough women for the needs of the male group, as otherwise the prohibition of marriage within one class could not be explained. The author believes that the primitive amicable contest, waged within the horde, for the possession of various advantages, gave rise to the custom of marriage by capture. Originally an unregulated habit, it soon became an individual fashion, then an established custom and later on a group-habit, that could not fail to meet with religious and social sanction,—factors most decidedly contributing to the perpetuation of such customs.

All this is a recognition of a most fundamental psychological fact that in all primitive social phenomena, normative custom always forms the culmination of a long evolution, in fact, its conscious regulative principle. This is contrary to the method of rationalistic interpretation, that puts the normative influence at the head of the process. Wherever the sanction of a norm is not present, and habit forms the sole support of a phenomenon, there the latter is easily modifiable by the appearance of new motives. The means of perpetuation of the influence of exogamy is found in religious sanction; the unsanctioned capture of women soon passed into a sham, the religious marriage ceremony having originated in times very much more recent.

Only the capture of the females by contests among friendly classes would admit the consequence of the captured woman's continued adhesion to her parental group, extending this privilege to her children also. However, metronymy was not at all in indisputable predominance in primitive society; and this seems to imply the early presence of factors tending to hasten the ascendancy of patronymy and its culmination in the individual family.

It is natural that the blood forms the original relational bond within a family and to this stage belongs the belief that the blood is the means of transmission of the soul from one body to another. A modification of the ideas of kinship involved a change in soul conceptions. The author suggests that the ascendancy of patronymy might have been helped by the rise of the idea of breath as means of psychic bond. The last breath of a dying man meaning the escape of the soul from the body, it might have been inferred that the soul could pass from mouth to mouth, by the breath, and this might account for the origin of the kiss. In this light, the long struggle between metronymy and patronymy, appears also as a contest between the blood-soul and the breath-psyché.

The content of primitive soul-belief being supplied by a dream-vision of the deceased ancestor, and, this becoming impossible where a recollection of an ancestor had ceased,—as was the case in regard to more distant relatives,—it became the mission of another concept to retain, within the limits of primitive imagination, the form of the ancient ancestor, the founder and heavenly protector of his progeny. The primitive man, detecting in the animals around many traits superior to his own, readily turns to the idea of soul-similarity between animal and man, and, through the belief in soul-metamorphosis after death, bridges over the chasm opened by the failure to find a content for his notions of the soul. This soul-animal, the carrier of the prim-

itive soul-idea, is then recognized as the animal ancestor of the group, and this is the early form of ancestor-worship, *i. e.*, the direct expression of the mythological embodiment of primitive social order.

Such are the phenomena known as totemism. It had found its beginning in the aboriginal ideas of the soul and, along with these, passed through a great many modifications, during a long cultural process, finally becoming so unrecognizably changed that it is almost impossible to discover the secret of its origin, in spite of some few of its still persisting traces.

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#### THOUGHT.

*The Concreteness of Thought.* GEORGE H. SABINE. Philosophical Review, 1907, XVI., 154-169.

*The Material of Thought.* Ibid., 285-297.

Pragmatism shows perhaps the extreme reaction of the special sciences upon philosophy, and it may be regarded as not wholly free from some of the failings which are characteristic of such reactions. In the two articles which form the subject of the following outline the author avoids the anarchistic tendencies of pragmatism and still retains a philosophic scheme which should be quite as acceptable to the special scientists as pragmatism. He starts from the common assumption that "experience is the only reality and must be the foundation of any philosophical system, . . . and experience is real, in proportion as it is concrete." The discussion then turns about the significance of the term concrete, and the thesis of the article is: that rational thought is a process of concretion, not of abstraction from concrete experience.

Immediate experience does not include the whole concrete object, it is always deficient in certain of the properties of the object and in many of its relations. Those factors which are wanting in the original experience are added in the process of rational thought, *i. e.*, by interpretation of the given facts, or explanation in terms of their relation to the other facts of experience. The concrete then, as distinguished from the abstract, will unite that which is complete in its individuality, in all its properties, with that which is complete in all its relations. Our actual experience is never wholly real, in the sense of being absolutely concrete, that can be attained only in the ideal experience, where all aspects and relations are complete.

Abstraction in thought is always a means, never an end, it is a

means of reaching the end of concrete rationality. The special sciences abstract, in that they divide up the field of experience and develop self-consistent conceptual systems, in order to further the wider, more comprehensive end, of a completely organized or rationalized experience. Both the man on the street and the man of science assume that experience is rational; in as far as it is irrational, *i. e.*, in any sense contradictory, it is unreal. It is the function of thought to eliminate the unreal. The concrete, the real in the strict sense of the term, is not the partially organized immediate experience, but that experience integrated, organized, rationalized by the process of thought.

The second article on 'The Material of Thought' is a further development of some phases of the philosophical scheme indicated in the preceding paper. The subject is approached by a keen criticism of the philosophical point of view, which either directly or indirectly makes a division of experience into form and material; the attack is directed especially at the modern form which that doctrine takes in the work of Professor Rickert. The perceptual world, the author maintains, is not an infinity of individuals, in the strict logical sense of the term individual, nor is the result of scientific thinking on that perceptual world merely a consistent system of abstract relations. This idea of a conceptual world, poles removed from the perceptual, is the result of that false division of experience into form and matter. The nearest approach to such a mass of unrelated subject-matter, for thought, the formative factor to work upon, should be found in the most primitive starting point of experience, but experience never occurs except as partially organized. Thought as the organizing factor is present in the simplest conceivable experience. Furthermore, the material of thought, or the incentive to the development of the completely organized experience is not, as Rickert maintains, an infinite variety of individual objects and the need of manipulating them for practical ends, but rather the *inconsistency* in experience between the perceptual situation, which is unsatisfactory, and the ideal situation, which is fitted to remove the unsatisfactory features.

Observation does not furnish the raw material for thought to work upon, observation would mean nothing in a perfectly unorganized experience; on the other hand, as the author states, 'observation should be conceived of as one moment, in the total function of rationalizing thought.' In its undeveloped stage experience has two deficiencies, its organization is imperfect and the facts are incomplete. Thought in the most general sense discovers its function in the supplying of these two imperfect phases. And in the very process of the development of

consistency in an incomplete experience new facts are discovered and further problems brought to view, in the general interest of the construction of a complete experience, in which both the facts are all gathered and consistency is perfect. The author concludes that any ultimate distinction between form and material of thought is a pseudo-distinction. The purely perceptual and conceptual represent but the extreme limits of two processes of abstraction, one is at the point of immediacy, the other at that of abstract relation, which has no contact with actual content; the concrete real lies between these limits and includes both, at one end an at least partially organized experience, at the other perfectly organized experience.

The above outline does not pretend to do justice to all the steps in the arguments contained in Sabine's two articles, which are in themselves very condensed and pregnant with interest and suggestion. Neither is this the place to enter upon an extended critical discussion. There are several points which are well worth further development. The feature which is so notably present in the discussion, and which is too frequently so notably absent from purely philosophical discussions, is the sympathetic appreciation of the rôle played by the special sciences in the development of the unification of knowledge.

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#### PERSONALITY.

*New Search for the Soul.* E. M. WEYER. International Journal of Ethics, 1907, XVII., 232-246.

The author recalls the two distinct modern attempts to clear up the mystery of the soul, namely, that made by Kant which ended in his continued faith that the soul exists but also in the conviction that 'its abode is in a region whither mortals cannot go'; and that made some seventy years later by the materialists, among whom were Moleschott, Büchner, *et al.*, who insisted that mind is a function of brain.

This theory was interpreted to mean that with the death of the brain its function, and consequently our consciousness, will cease.

He then goes on to assert that, though all of the experiences which depend for their existence upon the functioning of the brain were blotted out at death there is still, flowing parallel to 'the fleeting pageant of external images,' a stream of 'other mental experiences' which has 'no demonstrable dependence on the brain.' It is "the content of this second stream that he proposes to weigh over against all the relatively objective factors of mind — sensations, ideas,

and such other phenomena as are known to owe their origin to the activity of the brain." This second stream is defined as the flow of *feeling*, within which 'is all the zest of life contained'; beyond it lies nothing that of itself could make immortality desirable. The author would not deny the connection of soul and body; yet for him the limitless variety of feeling makes the mechanical explanation especially doubtful. Again, he finds no true memory of the feelings. "In recalling the past we experience feelings that rarely even remotely resemble their originals."

It is only by the gratuitous assumption that feeling has a universality of its own apart from the particular experiences of life that he reaches the conclusion that "even our opponents cannot reasonably expect the discovery of a feeling-center in the brain, since no person while retaining consciousness has ever been deprived of this universal faculty."

On this matter of the feelings in relation to the brain, the final word seems to be *ignorabimus*. "The man of science may hold the materialistic view, but the same man as a man of feeling may hold another." To explain this paradox the author sets up a dualism,— "the brain and the products of the brain belong to one sphere; the feelings to another." "The faculty of reason is a brain process; . . . the feelings . . . occupy an inner realm of consciousness." He concludes that "an advantage is thus gained by identifying the immortal part of man with the current of feeling: the soul can thus exert a guiding influence on our earthly lives." With reference to the life beyond, the feelings, in that they constitute the warp and woof of personality, are alone qualified to span the chasm to another sphere, maintaining the thread of personal identity, which, if severed, must render any form of immortality absolutely meaningless.

The conclusion is thus reached that our personality can persist without the 'artificial aid of memory, which is the frailest of our faculties and a serious obstacle in many doctrines of immortality.' Regarding this solution each individual must judge for himself, but 'the weighing should occur in the realm of feeling where each personality is a law unto itself.' Finally, 'every successful search for the soul is a personal matter; each must make the search for himself.'

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## MEMORY.

*Ueber Lesen und Rezitieren in ihren Beziehungen zum Gedächtnis.*  
STEPHEN WITASEK. Zeitsch. f. Psychol., 1907, XLIV., 161-185,  
246-282.

These memory tests of the comparative effectiveness of reading and reciting were made, as is usual in such cases, with nonsense syllables. At each test the subjects were given new material. In the memory repetition the errors were corrected, but the nature of the failures was always recorded. The experiments indicate that retention is favored by first reading the series of syllables a number of times — probably about eleven are the best — before the memory repetition is begun.

Comparison of the retention resulting from the several successive readings showed that the first made the deepest impression. The additional effect of those which followed gradually diminished. The same result was also obtained from successive memory repetitions.

In reciting the syllables the improvement in retention through successive repetitions — the degree of success in the first repetition being the basis for calculating the percentage values — diminished steadily, though no marked difference between any two successive recitations was found. The rapidity of this decrease in effectiveness was generally more noticeable when the first impression was especially strong. Memory repetitions gave better results than mere reading.

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## BOOKS RECEIVED FROM MARCH 5 TO APRIL 5.

*Are Bees Reflex Machines?* H. v. BUTTEL-REEPEN. Trans.  
by M. H. GEISLER. Medina, Ohio, A. I. Root Co., 1908.  
Pp. 48.

*Die neuere Tierpsychologie.* O. ZUR STRASSEN. Leipzig, Teubner,  
1908. Pp. 78.

*A Mind that Found Itself; An Autobiography.* C. W. BEERS.  
New York, Longmans, 1908. Pp. x + 363.

*La Psychologie inconnue. Étude expérimentale des Sciences psychiques.* E. BOIRAC. Paris, Alcan, 1908. Pp. 346. 5 fr.

*El Alcoholismo y sus efectos.* V. DELFINO. Preface by J. SCOSERIA.  
Barcelona, Granada y C<sup>a</sup>, 1907. Pp. 189. 4 reales.

*Modern Classical Philosophers. Selections illustrating Modern Philosophy from Bruno to Spencer.* B. RAND. Boston and New York, Houghton, Mifflin, 1908. Pp. xiv + 740.

- Identité et Réalité.* E. MEYERSON. Paris, Alcan, 1908. Pp. viii + 430. 7 fr. 50.
- Psychologie d'une Religion.* G. R. D'ALLONNES. Paris, Alcan, 1908. Pp. 289. 5 fr.
- Physionomie et Caractère.* P. HARTENBERG. Paris, Alcan, 1908. Pp. 218. 5 fr.
- The Persistent Problems of Philosophy.* M. W. CALKINS. 2 ed. revised. New York and London, Macmillans, 1908. Pp. xxiv + 575.
- Grundlinien der Psychologie.* S. WITASEK. Leipzig, Dürr'sche Buchhandlung, 1908. Pp. viii + 392.
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### NOTES AND NEWS.

THE annual meeting of experimental psychologists will be held at Harvard University on April 15 to 17.

THE Sixth International Congress for Psychology will be held at Geneva, August 31 to September 4, 1909. In previous congresses the large number of papers presented, their necessary condensation and hasty reading, and the great variety of topics treated, have been the ground of considerable criticism. The Committee in charge suggest in their preliminary circular that the coming Congress concentrate along three general lines: 1. The discussion of a limited number of live questions, on the basis of reports and counter-reports which shall be presented to the Congress, these reports to be printed in advance, so as to afford opportunity for the preparation of objections or suggestions by those taking part in the discussion. 2. Several sessions to be devoted to the question of psychological terminology; the Committee intends to present to the Congress a scheme of terminological equivalents for the principal languages. 3. An exhibit of apparatus, as at former congresses; it is proposed, however, to devote more time to their examination and demonstration than hitherto. The Committee asks for suggestions regarding this program, and particularly as to the choice of topics for discussion. (Th. Flournoy, *president*; P. Ladame, *vice-president*; Ed. Claparède, *general secretary*; Champel 11, Geneva, Switzerland.)

WE regret to note the death of Dr. Eduard Zeller, the veteran historian of philosophy, on March 19, at the age of ninety-four years.

THE

# PSYCHOLOGICAL BULLETIN

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THEORY OF VALUE AND CONSCIENCE IN THEIR  
BIOLOGICAL CONTEXT.

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It is a besetting fault of our constructive thinking to overestimate the load which a distinction will carry. We prove that conscience is uniquely different from the calculus of values and think we have saved ethics. We discover that theoretical judgments and judgments of appreciation are fairly independent, and hasten to found philosophies of religion upon the breach. With these and other dichotomies we renew the experience that unless we have something more than a difference, what we accomplish is simply to insulate our ethics and our religion. What tempts us repeatedly into this dead corner is, I believe, the conviction that mind must be studied on its own ground: whereas the truth is that regarded thus intimately and ideally the objects of our inner experience tend to fall into just these fruitless disparities.<sup>1</sup> In my own attempts to gain relief from such situations I have found myself moving, more or less clearly, in the direction of physical theory.

<sup>1</sup>The more contemporary psychology exerts itself to be purely experiential, the more it finds itself busied in listing the 'irreducible' elements of the mind. This is true particularly of German psychology where good judgment is less likely to interfere with consistency of method. It might save some trouble to observe that all aspects of the mind as pure experience are irreducible. Pleasure is pleasure; Begriff is Begriff; reason is reason; nothing is identical with anything else—not even with the aggregate of its elements; everything is simple and unique. It is well to note this truth,—to insist on it is to spin on our boot-heels. An irreducible is an object of which we can only say that it is what it is; of this material no science can be made. The tendency which isolates these objects has something idealistic about it, perhaps; but since it has nothing but the 'given' to offer, it is necessarily dogmatic and exclamatory. Only a genuine idealism can afford to be thoroughly materialistic in its first explanations.

I have come to believe that there is a certain inevitable logic in this. Our inner experiences, our oughts, our happinesses, our values, even our pleasures among themselves, must as objects of thought remain miscellaneous furniture, each turning its back to the other in default of common understanding, unless we can bring some finely indifferent unit of order and comparison into them. The first business of all explanation is to express a thing in terms of what it is not—an event in terms of its cause, truth in terms of process, sensation in terms of motion. Other things equal, the more alien in nature the terms in which a thing is expressed the more successful the explanation: the thing has its roots in the utmost corners of reality—the demonstration is complete.<sup>1</sup> Now nothing is so admirable in its categorical indifference to the concerns of the spirit as is physical nature. It has no member either in the psychical movement or influenced by it. It is a seamless garment of interweaving threads; it is what the mathematician calls, in a word, a closed group, and the physicist, a conservative system. This complete conceptual independence it is which chiefly qualifies it for serving as a terminus of explanations for the peculiarities of spirit. Its alien quality (once it is admitted to be a part of the same world with spirit) insures that no aspect of consciousness will be unrepresented in the physical system; there will be nothing even in the relation of consciousness to its world of objects and to other subjects which is not shown in its field by some exact metaphor. That is to say,—the elements of consciousness which on their own separate ground are mutually repellent, find themselves mirrored in a homogeneous world no part of which can get out of relation to any other, and from which, therefore, if we have the key to the metaphor, those relations can be read and understood.

But this logical hint is enforced by a more substantial consideration. It is reasonable to suppose that the answer to any question will be found in the context of the phenomenon that calls forth the question. There are good grounds for thinking that whatever plurality the mind

<sup>1</sup> The difficulty always is to see that such explanations explain. To explain a thing by what it is not—that is to explain one mystery by another. But is there nothing illuminating about that? The company which miseries are said to love lightens them; mysteries love company also, and for a similar reason. If we are satisfied to look no longer for the supports of the earth because a group of unsupported planets can be self-supporting we must be prepared to recognize similar relations among facts. Every datum, taken alone, is dark, just because it is ultimate. This stranding upon ‘data’ is empiricism’s weak spot, and its opportunity. The thing that relieves data of darkness is, not more data exactly, but the group-form into which data assemble themselves.

shows, whatever temporal movement and flux, is due to its entanglement in nature; or, to read the same relation from the other end, nature may be the temporal and plural life of the mind. So of each several aspect of the mind. Conscience, for instance, has no variety, no application, no career, except for its commerce with our 'empirical' instincts and desires; and desire, in turn, has no variety nor development, except in the toils of a differentiating organism. Very probably, also, conscience splits off from desire or desire from conscience on some rock of nature. Hence, without any assumption as to which of the two, nature or mind, is the prime mover in this differentiating process, we should naturally look for our principles of synthesis in that same region of things which reveals the cleavages. Genetic surveys have always the advantage of showing the emergence of the thing in its 'natural' relations — in the case of conscience, for instance, it will be found in the company of those desires and impulses with which it is destined to concern itself as regulator. Nature can give no sign of conscience except in the midst of its business. We have not first to deduce the thing and then its application; but if we find it at all, we shall find the application first and the thing in the heart of the application.

Now what we need above all things to make nature eloquent of mind is a distinction of categories. Not every aspect of consciousness is represented in the physical context by a separate organ or process; we must be ready to appeal to the higher physical categories, the configurations of organs and processes, accelerations of processes, and other differentials and modifications of energy. What nature shows us is not simply a metaphor of consciousness (and hardly that — for its language is all but literal), but it shows us a finished *analysis* of consciousness. We know that whereas in itself pleasure is simple, conscience is simple, and nature is simple, the attempt to express one in terms of another brings out the subtleties of each; and we shall not expect to find every unitary mental state marked out in the body by tangibly colligated physiological phenomena. We should be guided much more truly by the principle that psychical categories are complementary to physical categories. The first aspect of a psychical *one* will be a physical *many*; this physical many will have its physical unity also, but that unity will be found in physical functions which are the more derivative in proportion as the psychical category is more substantial. The unity of the 'self' may thus be the last thing for which the simple physical expression is found, though that simple expression necessarily exists. The processes which belong to a self are naturally more widely dispersed and more various than those which belong to

such imperfect and fragmentary unities within a self as 'an experience,' 'an idea,' 'a pleasure,' etc.<sup>1</sup>

The term 'idea' however will play a constant rôle in the theory I have to propose, and it will be desirable to sketch its physical interpretation before attempting the special question of the nature of value-experience. I shall attempt in the end to show, through these physical expressions, that values and conscience are functions in the life of 'ideas,' and to point out definitely, in the same language, what these functions are. Our disjointed world of facts, appreciations, and duties, may then be seen in some intelligible shape and connection on a basis other than metaphysical, though at every point the shapes of nature are but the intaglio of the spirit.

### I. THE BIOLOGICAL EQUIVALENT OF 'IDEA.'

If our interpretation of freedom is valid,<sup>2</sup> the fact that any given physiological apparatus works 'mechanically' creates no presumption that it is unaccompanied by consciousness. Consciousness is not introduced into the biological series at the point where mechanism fails to meet the needs of adjustment, because there is no such point. Hence 'instincts,' however truly explained as congeries of simple automatisms

<sup>1</sup> In the interpretation of the *freedom* of consciousness we have a clear case of the complementary nature of physical and psychical categories. The freedom and initiative of consciousness is represented in nature by the obedient regularity, sometimes called the necessity, of physical sequence. This is the only basis upon which the relation of the free spirit to nature can be made intelligible. In a machine whose parts have any slack or lost motion the eye will discover the origin of pushes and pulls by the direction of the slack. But in a machine all of whose connections are perfect, so that there is not even infinitesimal slack in any part, it is impossible for observation to discover whether the wheel is pulling the piston or the piston pushing the wheel. Nature as a mechanism certainly offers no visible suggestion as to the seat of its original impulses; it simply goes its perfect way; and this alone it is which enables me to accept unreservedly the testimony of consciousness that itself is the active and original thing in the world, all else being ultimately passive. With this understanding the chief difficulty in all biological accounts of conscience is relieved — how, namely, out of natural law, that is, out of absolute obedience, can come the dictator. It is just because nature is the region of perfect obedience that the dictator has to 'come out.' In all strictness, dictatorship is simply the permanent outside of nature; and nature gives birth to conscience as it were, by way of confession. What we see in nature is the gradual perfection of the receiving organ, so that freedom acquires growing significance as life moves on; but some receiving organ is always there, the regular is the continuous signature of the free. We have therefore *no separate place* to make in our account of value or conscience for freedom, since it is completely expressed in the character which makes nature nature.

<sup>2</sup> See preceding note.

of tropic character, may at the same time represent some element of consciousness. Such an element would necessarily be a 'universal' or general idea; for the instinct is related not to individual objects, but to a type or class of objects, in such wise that *whatever* object affords the proper stimulus releases the appropriate action. To consciousness the stimulus would appear not as 'this individual object' but rather as 'a specimen of this *kind* of thing' toward which such and such a line of action is desirable.

The repetition of the stimulus would present to consciousness 'another specimen of the same type,' and the similarity of response might connect itself for that consciousness with some quality common to the two particular objects; but we who look on can see that the *identity of the idea* lies not primarily in any objective characters of the two experiences, but rather in something which the organism carries around with it, and which exists when there are no 'experiences' to set off its train of behavior. I wish to show not only that there is a biological equivalent for the permanent identity (sometimes called the 'timelessness') of the idea, and for the native difference between an idea and 'an experience,' but also to show that the idea has a more continuous presence in consciousness than the experiences in which it is subsumed from time to time. An idea is in fact never absent from consciousness; the prevalent belief that it vanishes and reappears is a confusion between the idea and the experience. Recognitions of objects are intermittent; but our ideas, it should be evident, are not what we think *of*, they are what we think *with*. Now whatever else the unity of a consciousness may mean, it also means that there is no isolated action of ideas, but that I think with all of them at once in each moment, though the 'bearing' of any given idea upon any given experience may be very remote.

But beside the ideas that correspond to instincts, that is, to the various modes of regular, quasi-official dealing with objects, there is a set of ideas of a different sort, which I may call the *field-ideas*, such as the idea of extension, or the physical continuum, or of a particular friendship, or that important symbolic idea 'the whole of things.' These do not correspond to any outlinable instincts; their biological expression must be sought elsewhere. But inasmuch as the field-ideas develop in close concomitance with the development of the instincts, the nature of the biological expression may appear by considering the *interaction* of instinct-ideas in the course of evolution.

The evolution of ideas in its most general biological character may be summarized as a matter of the *balancing of instincts* — that is, of

the emergence of 'secondary' or counter-instincts, which act together with the 'primary' instincts as more general instincts than either alone. Such a pair will be represented in consciousness by a more general idea. Now we have to note that every time one instinct has been balanced by another, consciousness has acquired not only a new type or class of objects, but also an idea of much greater scope than that corresponding to either of the two instincts separately. Just as my present impulse cannot be checked by the suggestion of something future without making me aware not merely of the two points in time, but more or less dimly of the stretch of time between; so the generalized habit of modifying the present impulse by the consideration of future contingencies cannot be established without making the idea of the *time-field* a correspondingly firm element of my conscious vista. So in proportion as I learn to modify my reflex upon what is here by the suggestion of what is not here, the idea of *space* becomes a mastered range of mental vision. The logic of the process is this: that whenever an *x* meets its non-*x*, *x* having been my largest class, the two can coexist in the same mind only as parts of some 'universe of discourse' whose scope will in general be very much greater than *x*. The development of an inhibitory instinct, therefore, can never mean the setting of one suggestion against another simply, but it means opening a whole field of possible variations where before there was but one fixed line. This whole process of balancing instincts, impulses, suggestions and associations means that the mental range is becoming more complete. Man's peculiarity in biological terms is his extraordinary balance—throughout his being he stands on two feet. It is this same peculiarity which in psychical terms is expressed in his extraordinary capacity for gripping large totals, and at last for coming to use the category 'the whole.' The use of this category is reason.<sup>1</sup>

Now any one of these vista- or field-ideas, as we may call them, varies greatly in vividness. This vividness will be a function of the intensity of the *x*-impulse and also of the intensity of the non-*x* suggestion. The consciousness of time, for instance, is made vivid by the conflict between the claims of a pungent present and a pungent future. Let me suggest that a vivid representation of a future moment and therewith of the time-field, whether voluntary or resultant, stands for an expenditure of actual physical energy; and that the continuous and

<sup>1</sup>The effect of the counter-instinct in developing a field-idea shows itself in the phenomenon of *hesitation*. Now the resultant of two instincts is just as determinate as the action of one. Hesitation means not that two possibilities interact, but that a range of possibilities has to be run over as a relatively independent object. Man's fitness for reason is concomitant with his preëminent fitness for hesitation.

easy presence of future and past to our vision represents a high level of potential energy in the nervous elements concerned. In general, I would propose that the extent of the ideal-whole in whose presence a conscious being lives and to which he adjusts his action is biologically represented by the potential energy of the nervous centers.

## II. THE THEORY OF VALUE-EXPERIENCE.

The earliest and simplest instincts seem to be of such sort that the 'perception' of the stimulus and the 'gratification' of the instinct are one and the same process. Dealing with its object either by contact or by immediate reaction the subsumption of the general idea *is* the satisfaction. Despite the immense veiling of the phenomena of pleasure and pain by the complexities of development, the profuse demarcation of states of consciousness as 'ideas' which are neither instinct-ideas nor field-ideas but perhaps fragments thereof, I believe it can be shown that all pleasure is still of the nature either of subsumption (wherein an idea, or a conceptual whole, is applied to one of its instances) or of induction (wherein some instance or series of instances are provided with a conceptual whole which covers them). The joy of making a successful induction and the satisfaction which a child takes in applying a new word, are typical of all our positive values.

I cannot here make attempt to cover the field of value-experience, nor to account for all the well-known anomalies of our feelings of pleasure and pain. I shall review simply in very rough outline a series of phenomena which seem to me fundamental in the sense that any theory which will explain them will explain the rest in the long run.

1. Pleasures connected immediately with the senses and with the several physiological functions have their marked rhythmic intervals; and the longer the period of intermittency, the greater, in general, the volume of the pleasure (Spencer). This dimension of pleasure seems to be a function of the nutrition of the organs concerned.

2. Pleasure is itself a destructive and exhausting process. This is a natural inference from (1). Pleasure heightens life—that is, it quickens expense; it draws living to a focus as a flame creates its own draught. The intensity of a pleasure varies directly with the rate of destructive metabolism.

Pleasure may 'accompany states in which the organism is being built up' (Royce, and many others); but the process of building up is incidental to the pleasure itself, a biologically fortunate incident indeed, but having no representation in consciousness. The actual

succoring of the organism occurs later in time than the pleasure and affects first of all parts quite different from those concerned in the pleasure. In the long run pleasure is normally profitable to the organism; it usually accompanies only such expense as the body is happy to restore; the drain affects primarily funds which have been appropriated for that particular purpose; and these circumstances have something to do with differentiating pleasurable expense from painful expense. But *per se*, pleasure is a drain.

This is a clear instance of the complementary relation between physical and psychical categories above noticed. As an experience, pleasure is indeed a filling up of the cup, the supplying of a need. And the deeper the draft upon vital resources, the greater the fulfilment of desire. This holds true to the limit. Only that delight can ultimately satisfy and fill the soul which drains the body to the point of death. Indeed, all joy is akin to death; the fortunate drone unites with the queen, and dies—a rapport symbolic of all pleasure.

It is, in part, confusion between these inverse psychical and physical categories which has misled so many of the best observers into the belief that pleasure is a psychical accompaniment of physiological construction. It is extremely doubtful whether such construction enters into consciousness at all.

3. It follows from (2) that the expense in pleasure is not confined to the organ immediately concerned with the object which is the occasion of the pleasure. To a certain degree, change of object will renew pleasure, and variety of object preserve it; but there is evidently a common store which every pleasure draws upon, independent of the particular organ or object. A person thoroughly exhausted in one joy is ready to enjoy nothing else but Nirvana.

4. The quality, ‘pleasure,’ is a function neither of the special nor of the general exhausting process alone, but of some relation between them. Pleasure is at the same time a *central* and a peripheral experience.

In psychical language, pleasure requires attention. The physiological design of consciousness must be one of concentration. However wide the range of a person’s affairs his whole interest must be recalled to the simplest experience he would enjoy. The process of ‘becoming absorbed,’ let us say in music, is at first a conflict with the inertia of other trends of interest: they must all fall into line at last. The intensity of the pleasure depends upon the perfection of the focus, that is, upon the absence of competition among objects of attention. The person is *all in the pleasure*, no matter if it be a ‘mere’ sensation.

5. But if it is important for the perfection of the experience that other interests cease to compete, it is equally important that they continue to exist. The quantity of the pleasure depends on the completeness of the recall, but it also depends on the presence of interests to be recalled. Pleasure is a function not simply of the fact of focus, but also of the amount of stuff concerned in the focusing. In this respect, different pleasures, so far from being competitive, depend each one on the existence of the others to give them magnitude: every pleasure has one dimension which varies directly with the number of instincts, or desires of possible kinds of pleasure — and not simply with the degree of differentiation, but with the ground covered by the differentiated interests, that is, with the range of the objects. In other words, pleasure is a function, among other things, of the idea-horizon; any given pleasure echoes into the whole cavern of a self, and varies in quantity with the volume and resonance of that cavern. Even within the career of a single pleasure it is noticeable that as absorption becomes complete and the circumference of the circle of consciousness begins to contract, the pleasure has passed its culmination, and will tend to zero until the interruption of another object of attention dissipates it.

All this points to the hypothesis that in all pleasure our 'field-ideas' are at work (not as thought of, but as thinking). The 'circumference of consciousness' is a variable which corresponds exactly to those changes in the vividness of the field-ideas which we supposed to represent a certain tension or potential in the centers. And this tension, we said, was in turn a function of the competition of impulses. For example, the extension of time-vista both forward and backward which marked the earliest economic advances of mankind, is concomitant with the growing possibility of inhibiting a present impulse by the idea of a future value. The continuous subjection of impulse to the consent of all the possibilities in a time-field means indeed an interference with pleasure in the sense that each claimant for attention has to struggle for possession; but it means that every object which gains this attention is the source of a pleasure whose value is greater than that of an undisputed enjoyment of the same object in proportion to the enhancement of the time-idea. In physical language, every increase of the potential energy of the centers increases all conscious values in the same proportion.

What the physiological processes are which play themselves off in the actual business of enjoyment, I can here do no more than hint. All pleasure is rhythmic and tends to self-maintenance. A mood,

which is a value-experience on a somewhat roomy and deliberate scale, becomes pleasurable in proportion as it learns the arts of life, as melancholy feeds and reproduces itself from node to node of its rhythm. The quality we call ‘ pleasure ’ is deeply connected with this formal character of the processes involved (a character which makes of them precisely what the mathematicians mean by a ‘ group ’). On the conscious side, it will be evident by a little observation, that the change which occurs when a trying experience after repetition becomes pleasurable, may be described as the acquisition of an *idea* under which each element of the experience is subsumable as it arises. When for instance anxiety in a given situation gives way to confidence, we have acquired on the intellectual side, *vista*, and on the practical side a readiness to meet with appropriate action whatever type of event may arise in the course of the experience. So with a mood : it is implicitly a Weltanschauung, and it lives by the process of corroborating its theory of things in the events that pass its focus ; in this commerce of its idea with the instances of life lies its satisfaction, be it a grouch or a glory. I propose that the same is true of organic pleasures. In them, nature has embodied in structure the *idea* concerned ; she has solved the problem of that particular evil for us (for doubtless all the destruction which is at the heart of consciousness is intrinsically painful) ; and the idea she uses will be most difficult to drag into the foreground of vision. But that the idea is present in physiological concentration, and can in time be read, no one who follows the spiritual progeny of any instinct can question.

My thesis then is simply this : that all pleasure is essentially a process of intercourse between an idea and its instance. The field-ideas of any consciousness will be concerned in all of its pleasures ; and each of these pleasures will have as one of its dimensions a quantity which varies with the effective range of its total field.

### III. THE THEORY OF CONSCIENCE.

Since Spencer, much has been done by way of distinguishing conscience from those types of inhibition which more or less closely resemble it and ally themselves with it. The work of describing psychologically the unique characters of conscience is in the nature of the case always unfinished ; but it will be sufficient for our purposes if, by way of a phenomenology of conscience, we may make clear the separation between conscience itself and the *load* which conscience carries or adopts.

The load is the relatively changeable aspect of conscience. Every

individual in the course of his career makes numerous changes in the points of scruple which constitute the burden or application of his conscience; the race has done the same thing on far greater scale. Perhaps the first burden and certainly the most permanent protégés of conscience are the 'secondary instincts' — but they are not conscience. This load makes use of all accessible means of support: pains, punishments, associations of approval and disapproval, and all the well-known instruments of social propagation, so that in the contents of conscience as we find it in ourselves there are motives traceable not only to our own education and experience but to every stage of our historic and phylogenetic journey, motives in which the aspirations of the Orient, or even the sorrows of those remote pre-moral ancestors whom Spencer invokes, are among the comparatively recent relics. But all this is something other than conscience. No theory indeed is complete which does not explain the circumstance, remarkable enough in itself, that conscience has the capacity of allying itself with all this material — that it is able so early in human history to lend effective support to a struggling secondary instinct, and to turn the natural disadvantage of the remote consideration into some sort of equivalent chance for survival. But the first point is to distinguish the thing itself from all its adoptions; and I shall resume very summarily what seem to me the most significant points in that separation.

1. Conscience has nothing to do primarily with the way we feel about any specifiable *kinds of action*. For it is a more central affair than can be described in terms of a connection between types of action and such elements of experience as might adhere, by association, etc., directly to these types.

Nothing is more astonishing in the earliest history of the moral motive than the speed with which it shakes free from peripheral lines of association and becomes an organic attitude to action in general which it requires some use of subsuming intelligence to apply to particular kinds of action. The function of those *third parties* to the moral situation which appear so early in moral development — the alleged first ancestor, the totem, the lawgiver, etc. — is primarily that of supporting conscience in this central position, the position, that is, of relative independence of the 'types of action' and thereby of more or less freely variable application to them. Psychologically expressed, the thought of an action has to pass through the thought of this third party, with the regime he represents, before that action or kind of action is considered right or wrong.

2. The painful quality which we attribute to the motive side of

conscience is also a part of its load; that is, it is adventitious. Conscience is necessarily painful only in so far as all hesitation, or the halting of immediate satisfaction, is painful. Whatever traces and suggestions of past pains and punishments conscience bears with it must be referred to its accretions, not to its nature. The sort of check which conscience imposes upon action is more nearly like that which some inarticulate presentiment of a greater good might impose upon a definable good. But strictly speaking, conscience has nothing to do with represented pleasures any more than with represented pains, nor with any represented utilities of an inheritable sort, as will appear from the following :

3. Conscience resembles the æsthetic consciousness in being a continuous source of new requirements, not traceable to any 'lessons' of previous experience. If it were the record in us of experiences of any sort already finished and organically digested it would tend to fading rather than to finesse. But nothing more than conscience is subject to explorative origination, and to the sport of virtuosoship.

The theory of the biological aspect of conscience which I have now to propose is simple. It depends upon the theory of ideas and values already developed, and needs but one further preliminary,—the proposition, namely, that any *flux* in consciousness is, or may become, itself an object of or factor in consciousness.

Just as we have impressions not only of distinct static objects, as stones and trees, but also of *processes*, as dawning or waning of light; so we have awareness not alone of high spirits and low spirits, but also of the rise and fall of spirits, if these changes are sufficiently rapid; so also, of the flux of vigor, of the loosening of attention, etc., — sometimes even of waking or falling asleep. I presume that every flux in consciousness is in some measure an object of consciousness, for consciousness is by definition, 'that region in which appearance and reality coincide'; though it may well be that few fluxes are separately registered and noted.

Now if our theory of values is sound, the most significant of all fluxes in any consciousness for the integrity of its values would be a flux in the effective range of its field-ideas; for we proposed that the field-ideas were factors in every particular experience of value. Physically, every pleasure has for one of its factors a coefficient of potential tension in the centers; and the potential capacity of these centers has been very gradually extended as instincts have balanced each other, the most sensitive index of this growth being the range of effective bearing of our field-ideas upon the immediate business of

living. Any act which rejects the bearing, let us say of the future upon the present, wilfully obscuring the time-vista and tending to diminish its efficiency in consciousness, will strike a blow at the degree of all values in that consciousness. It will do so, moreover, in a way of which the agent can at the time have no inkling.

Conscience, I believe, is the perception of this differential; that is, on the physical side, it is a recognition of the flux, real or virtual, of potential capacity in the nervous centers; on the side of consciousness, it is a sense of flux in the valid bearing, or efficiency, of my field-ideas. Or, since all field-ideas in the same consciousness must come, as we have said, to an understanding with each other, so that they act as parts of a single field which we may symbolize abstractly as 'the whole,' conscience may be described simply as the perception of flux in the awareness of the whole.

In this description the word perception is open to valid objection, inasmuch as the consciousness which is experiencing the flux in question does not interpret its experience in terms of any such flux. The change which affects 'ideas' consciousness always tries to interpret as a change in 'experiences,' referring its uneasiness to the agency of mysterious *objects*, — the 'third parties' above mentioned. It would perhaps be better to say not that the flux is 'perceived,' but that this actual flux has become a separately effective agent in consciousness, leaving undetermined how consciousness, in its more or less bedevilled efforts to construe to itself what is happening, shall report these effects. On the biological side the language seems to me sufficiently precise. I make no attempt to portray to my mind the ultimate physical occurrences — an attempt which would be presumptuous with far more knowledge of these processes than I can boast: I am content to state what I believe to be the true *genus* of the event itself. To say that we are aware of a thing, is to say, biologically, that the representative of the thing is doing some work within. The work which conscience does, we thought to be inhibitive in character. Now wherever there are field-ideas at all, there are fluxes of field-ideas as a matter of course: but *conscience begins when this flux begins to be itself effective*, through whatever apparatus. Biologically, therefore, we may say that the 'recognition' of the flux above described consists in a *resistance* to a negative flux wherein the capacity of the centers is diminished. The biological equivalent of conscience is: A resistance to any tendency to diminish the potential capacity of the nervous centers. If this supposition is valid, it should at least accord with the phenomena of conscience which we have brought forward.

It is evident that conscience would from the start be independent of external experiences associated with any special 'types of action.' Conscience would work just as decisively in inhibiting an action which threatened our field-integrity in an entirely new and unheard-of way, as it would in the case of a thoroughly conventional mode of offense—perhaps better. But any external sign of disapproval upon an action undesirable in this intimate way would add its definite 'no' to the less definite 'no' of conscience; and any considerable group of such tangible corroborations of conscience would form a body of fusions which even to skilled psychological observation, if it were of the prevalent point-blank variety, would defy analysis. Conscience pure and simple is distinguishable only in its work of initiative and variation.

And we can see further how conscience would have an æsthetic and super-useful character. As a sense for a differential, it would vary with powers of discrimination; it would be a function of 'fineness of fiber.' It is entirely conceivable that a prodigy of conscience should appear in the midst of a relatively rough-shod community, which could not be the case if conscience were the vanishing echo of an already fixed racial inheritance. But if conscience outstrips utility, it is not hard to see that it would tend to be useful. For the field-ideas are but signs of the adequacy with which consciousness presents to itself its world. Conscience at any time stands for a superabundance of adaptation. But, as in many other cases, nature has had to adapt herself *generously* because there was no way whereby she could adapt just enough and no more.

Finally, we can see that as it would be impossible for early man to discover the nature of the evil that threatened him in his troubles of conscience, so it would be impossible for him to express it accurately in terms of any known good. Its voice in him, until he seized upon the sticks and straws of 'empirical' corroborations, would be chiefly that of inarticulate resistance, a check which gave no clear reason for its presence, a categorical imperative or forbiddal. But in so far as he tried to make plain to himself the uneasiness at his center he would have to connect it with the widest objects of his Weltanschauung—his future, his ancestors, and his spirits. For these remotest objects are only the outpost stakes which we have set as marks of the widest total mental ranges we have thus far conquered. The sense of duty as a strain indicates that the range of 'the whole' is being enlarged. The sense of pleasure which at length displaces duty in that same type of action may mean that this degree of totality is now secure. But unless we suppose that a man's mind can reach a complete adequacy of view,

the sense of duty can never, as Spencer suggests, be expected to disappear.

The final test of any such theory as this will be found in its ability to explain the history of the evolution of conscience. This immense task must be reserved. What I have here aimed to do has been accomplished — to show the natural relations of ‘ideas,’ values, and duties, through the medium of their common biological context.

## PHILOSOPHICAL LITERATURE.

### IDEALISTIC CONSTRUCTION OF EXPERIENCE.

*An Outline of the Idealistic Construction of Experience.* J. B. BAILLIE, M.A., D.Phil. London and New York, Macmillan, 1906. Pp. xx + 344.

In this work, Professor Baillie follows his notable *Hegel's Logic* with a metaphysics of experience done in the spirit of the Master. As in the earlier work, the *Phenomenology of Mind* is his effective 'open sesame.' The author, like Hegel in his 'voyage of discovery,' sets himself the task of proving the developmental character of experience and the fact that, throughout the development, experience is 'from one end to the other a realization of a spiritual principle' (p. vii). He makes effort, however, to guard against the danger to which Hegel's method is so liable, namely, of so accentuating the inadequacy of experience and the necessity for its sublation by the Real that experience, instead of being explained, is explained away. He emphasizes the fact that in giving an idealistic account of experience 'we should be able to feel that, in the result, we are in touch with actual experience' (p. vii). 'Experience lives and moves through different forms, each with a distinctive nature of its own' (p. viii). And yet he sees, too, that it is the very business of idealistic construction to show that in all our touch with experience 'we are dealing with a single principle controlling all its movements' (p. vii). He concludes, therefore, that "a complete idealistic explanation of experience ought . . . to show (1) that each phase of experience embodies in a specific way the one spiritual principle animating all; (2) that each is distinct from every other simply by the way it embodies that principle; (3) that each is connected with the other and so with the whole in virtue of its realizing that principle with a certain degree of completeness; (4) that the whole of experience is a necessary evolution of the one principle of experience through various forms, logically connected as a series of stages, manifesting a single principle from beginning to end" (p. viii).

The author cannot be too highly praised for the success which has attended his treatment of the first three problems. While he fully acknowledges his debt to the *Phenomenology of Mind*, a debt recog-

nizable on every page and in the spirit of the whole construction, it must be said that he has 'done over' the work of Hegel with such masterly lucidity and power that the meaning of the great idealist should be clear and his purpose vital and convincing even to those who, as Mr. Bradley says, have duly condemned him and are now willing to read him. The great merit of Professor Baillie's book is the 'sense of reality' that it gives. It is idealistic, yea, even to absoluteness; and yet it leaves one with the feeling that it has spirited away nothing in behoof of some *monstrum horrendum* of an Absolute. Experience, with its vividness, its distinctness, its sense of initiative, and freedom, and responsibility, retains its real qualities; the only difference that the theory makes, is that these, instead of constituting a haphazard world of 'the many,' judged at their surface values, are shown to have their place and their organic meanings within the orderly development of spirit, that development, namely, in which spirit comes, with more and more adequacy, to the expression of itself. As with Hegel, the course of the evolution of spirit witnesses not the utter rejection of the inadequate stages, but their transformation, so that in the perfect realization what is real in each stage has its effective function. The development of experience is regarded as a continuous and indeed intrinsic effort to win more and more adequate interpretations of that in experience which is the stimulus to its entire advance. Or, more concretely, the whole effort of experience, the motive power of its every stage, is to achieve unity with itself.

In the first pages of his book, one wonders often what the author means by his constantly reiterated statement that the end is 'unity.' One who comes from the obscurities of the post-Kantian schools and the super-obscurities of their commentators, dislikes to have 'unity' shot at him out of a pistol and quite without the courtesy of a preliminary warning. Take, for example, such a sentence as this (p. 24): "We seem bound to admit that, in the long run, the only objectivity which is final is that in which the unity determining finite processes within experience is simply the *unity of all experience as such*." Or again, on the following page: "To explain the ground of the objectivity which all forms of finite experience claim to possess, we must start with the idea of an Absolute Single Experience." One gasps at this, after but twenty-four pages of preparation! Yet, if the pluralistic-minded reader is but patient, he will find that, in the end, the unity intended is not the ogre 'One,' that terrifies into silence every peep for independence, but is that unity-in-freedom which is with equal reality an organic multiplicity; in short, the unity of spirit. Indeed, one of

the marked successes of the book is its clarification of the concept of ‘unity-with-self,’ or ‘Absolute Spirit.’ This concept has been the *bête noir* of those who have seen in Absolute Idealism nothing but an attempt to surrender all reality to an all-devouring One. And there is no doubt that the “black beast” has been real enough! Professor Baillie, however, shows with convincing power—what seems, whether always revealed or not, to have been the best insight of Hegel—that spiritual unity, although it is one and absolute, is not sheer and sole numerical oneness, but is unity of self with other self, a unity, however, so intimate, that separation of self from self is no longer possible. The unity of Spirit, therefore, is one which in the deepest sense presupposes spiritual plurality. Or, to use a phrase of Dr. McTaggart’s, although without implying his further conclusions, it is a unity which may, with equal truth, be described as a ‘self-differentiated unity’ or a ‘self-unified differentiation.’

The admirable, and for the cause of Hegelian idealism, triumphant chapters on ‘Moral Experience’ and ‘Religious Experience’ describe the advance of the human spirit toward the realization of its life as Absolute Spirit. In the realization of that life, the individuality so emphasized in Moral Experience is not eviscerated; it is but deepened and widened, made indeed into individuality that, notwithstanding, nay, even by reason of its particularity, is in strictest truth universal. The author shows with clearness the presence of the wider unity even in the emphatic individualism of Morality: “The moral life is said to imply ‘Freedom.’ To be free is to be ‘at home with ourselves along with others,’ to realize ends which are ends of our own choosing, and in which, when realized, we shall both find ourselves and have our self acknowledged by others. But that result does not merely *imply* Society, as if our moral life were our own individual affair, and Society were there merely to confirm us in our purpose. *It is literally the activity of a social, of a universal self-consciousness*, at every point. The end is ‘ours,’ we ‘choose’ it, *i. e.*, it is the expression of our self, of the self we are conscious of. But this means that it is ours *as distinct from the end of some other self*, whose existence and reality are therefore essential to make it possible for us to *call* it ‘ours’ in particular. . . . This means that the end is ‘accepted’ by others (or ‘rejected,’ as the case may be); *i. e.*, the end is *not merely ‘my’ end*, but the end for a universal self-consciousness” (p. 278).

Thus, although the Absolute is the end in view, there is no shirking of the problem of individual freedom. The merit of the dialectic is that freedom, which, in its usual utterances, is so brazenly atomistic, is

refuted out of its own lips and shown to depend for the very possibility of its being upon the reality of universal spirit. The author's constant effort is to show the profound error of the view of the world as an aggregate of isolated individuals. So he complains of Kant (p. 282) that for him moral individuals "remained individuals separate, unique, isolated *qua* individuals. . . . They remained unique, impenetrable units of moral activity through, and in a sense, in spite of, their following the same moral law. . . . The position of absolute idealism is sharply contrasted with all this. The universality of moral action is not an attribute of it, but its very essence, because Morality does not have any being at all until the self has achieved conscious universality and actively lives in and for it. The universality is not made by the act being moral. The universality is *there*, and *thence* comes the possibility of Morality. . . . And the universal self-consciousness, while it does not exist apart from self-conscious individuality, is *per se* as real, as actual to start with, and all along, as the latter. There is logically no *separation* possible between the two. A *distinction* there is, as we shall see, but that is not separation. Hence Society is not *derived* from individual activity as directed by universal ends. It is merely maintained by that process, and is as much a 'fact' as the individual's activity." Again, and more explicitly, he says of the relation of individual to universal self-consciousness (p. 286) : "Self-consciousness appears as self-sufficient in and through individuality, and does so in virtue of the fact that universality here is not an attribute of separate centers of self-conscious life, but a substantial universal self, constituting the very basis of the completeness and sufficiency any particular individual feels. There are thus two opposed or contrasted factors in this mode of experience. These are the life of universal self-consciousness,—substantial and actual universality; and the life of each moment of it,—the distinct individual centers sharing in and living by that universality. We cannot cut the two asunder."

Thus, when we have followed the author through the book, we find that the unity which he holds to be the stimulus to all advance in experience is not an all-engulfing, numerically identical One, but the unity of spiritual harmony. The importance of his view lies in the fact that for him the unity, even as a harmony, is not derivative of the individuals, a kind of common quality attaching to them all, but is as primary and substantial as they. Thus the author, like Hegel, cannot rightly be called either monist or pluralist. His category of Spirit will not suffer the bonds of these terms. His doctrine is one which, like Hegel's at its best, transcends both monism and pluralism in behalf of the richer reality of Spirit.

The first four chapters of the book are prolegomena to the interpretation of experience. The main object of these chapters is to demonstrate, especially by criticism of Kant, the error of the dualistic view of knowledge and reality, and to show that the true ideal of experience is the complete unity of subject and object, or of subject completely conscious of self. The author then proceeds with his developmental view of experience, showing experience to be of different 'levels,' the higher coming into being out of the lower and less adequate by the inherent dialectic of the latter. The key to the whole movement is briefly stated at the end of Chapter IV.: "The first step is to find out where to begin, and what are the main stages through which the argument must pass. This is easily stated. We have, as we have said, subject and object as the antithetic elements—the concrete reality of conscious experience, and the key to its entire meaning lies in the complete explicit unity of the two, the subject as conscious of itself in the object. Now the individual subject may be aware of an object as purely and simply other than, *opposed to*, itself, have not even a feeling of implicit unity with it. It may, again, be aware of *self* as *other than* but implicitly one with the subject-mind conscious of it. And finally, it may have overcome all sense of otherness in its object and be fully and explicitly aware of itself in the object of which it is conscious. More simply, perhaps, we may say that in the first stage the individual is conscious of objects which are *prima facie* quite alien to and outside the subject; in the second, of the self, but as something which is ostensibly different from, and over against the subject conscious of it; in the third, of the self as transparently identical with the subject." These main stages are further divided into Sense-Experience; Perceptual Experience; Understanding and the World of Noumena and Phenomena; Self-Conscious Experience; the Sphere of Reason or Scientific Experience; the Sphere of Finite Spirit or Moral Experience; the Sphere of Absolute Spirit or Religious Experience or Contemplation. As the author regards these several 'levels' of experience, he notes a development from the lowest stage, at which the world is perceived as 'things' and 'qualities,' to that at which it is thought as 'forces' and their 'manifestations.' Here distinction is made between noumena and phenomena, and 'explanation' is a conscious aim. Out of this 'level,' develops consciousness of self, first in the form of 'desire,' in which the object is selfless, and the self desiring is only a particular self; then in the form of 'recognition,' in which the object is itself a self and for a self. It is in this section that the author begins to show his meaning of spiritual unity as a unity of self

with self. Out of self-consciousness develops ' reason,' with its stages of observation, in terms of categories ; and of judging and systematic connection. The result of reason is to establish a self-determined universal experience (systematic connection). It implies a universal self-consciousness. Its further development, therefore, is in the form of the Moral Order of Society, where the individual acts in and through universal spirit. But in moral life, while spirit is established as supreme reality, it is realized only by effort and process. The end still to be reached is that Spirit shall be " fully actual to itself as a whole and as a unity containing all distinctions at once. To be conscious of it in this way is to take up the point of view of Absolute Spirit."

To one versed in Hegel, the development is, in its main outlines, an 'old story'; but Professor Baillie's treatment is so fresh and his independence of Hegel in the details of the dialectic often so clarifying that the Hegelian finds joy in the reading. To one much wedded to the 'trialectic' philosophies of the present, the comprehensiveness of the interpretation, its evident intention to grasp the meaning of experience from beginning to end, must either seem unblushing effrontery or splendid courage.

One point, however, must be made in criticism of Professor Baillie's treatment. At the beginning of this review, we stated the four problems which he set for himself, and we remarked that he had worked out with consummate skill the first three of them. His fourth problem was to show "that the whole of experience is a necessary evolution of the one principle of experience through various forms, logically connected as a series of stages manifesting a single principle from beginning to end." Professor Baillie seems to confine himself to but one meaning of 'necessary evolution,' ignoring altogether another meaning for which the reader rightly demands some consideration. Professor Baillie feels that he has shown the 'necessary evolution' of the stages of experience if he has found the lower stage dialectically demanding the next higher, and so on. But the further question remains, Why are any of these stages necessary? Why should we suppose that the process of Absolute Spirit 'requires' a level of perception, that must be transformed into, sublated by, a level of understanding? Why the need of the imperfect levels? It hardly solves the problem to say that all the possible relations between subject and object must be realized, for this simply begs the question by assuming that just these possibilities must be.

Here is just the 'blind spot' in all absolute idealisms up to date,

seeming to indicate that they have not considered with sufficient thoroughness the relation between the individual in his particularity and the individual in his encompassing universality. Professor Baillie wears his 'blind spot' with due physiological propriety, for he seems not even aware that it is there. His principle of Absolute Spirit, as the stimulus to the evolution of experience, is wonderfully effective *once experience of various 'levels' is granted*. But there is just the rub! In short, Professor Baillie has given us a *metaphysical psychology*, if the phrase will be allowed, not an *ontology*: he has described and shown the goal of the *development within experience*; he has not *accounted* either for the *development* or the *experience*.

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### LECTURES ON HUMANISM.

*Lectures on Humanism with Special Reference to its Bearings on Sociology.* J. S. MACKENZIE. London, Swan, Sonnenschein & Co.; New York, Macmillan Co., 1907. Pp. iv + 243.

These lectures were delivered at Manchester College, Oxford, on the Dunkin Lectureship in Sociology. As the author states in his preface, "the courses on this foundation are short, and open to the public, and so do not furnish an opportunity for the discussion of the fundamental principles of the science of Sociology." Dr. Mackenzie, has, therefore, devoted the first eight chapters of his book to an elementary, popular consideration of a number of the familiar social problems. The titles of these chapters for the most part suggest their contents: The Meaning of Humanism; The Growth of Humanism; Humanism in Philosophy; Humanism in Politics; Humanism in Economics; Humanism in Education; Humanism in Religion; Limitations of Humanism; Implications of Humanism.

The ninth and last chapter, which was evidently not delivered as a lecture, the author has added in order to furnish a fuller statement of the philosophical implications of the point of view that is central in the book. This is obviously the chapter in which students of philosophy will be most interested. The reader is made to look forward with keen expectation to this final chapter by the frequent foot-notes throughout the lectures, which are continually promising further and more adequate treatment of difficult problems in that last chapter.

One finds a disappointment on the first page of the opening chapter, on the Meaning of Humanism. Most readers will be attracted to the

volume because of its title, and will naturally expect to find here a discussion of those recent philosophical theories that have been advanced under the name of humanism. The author says, however, "I ought perhaps to explain at once that I do not use the term in quite that sense that has recently been given to it by a certain school of your younger writers. I do not use it as equivalent to what is commonly—and I think correctly—described as 'pragmatism,' or 'voluntarism.' . . . What I understand by humanism may be most simply described as a point of view from which human life is regarded as an independent center of interest, if not even as containing within itself the key to all other interests, or as being, in old Greek phraseology, the 'helm' by which the universe is steered. In this sense I contrast it with the more familiar term 'naturalism'—the attempt to understand human life in the light of the forces that operate in the world around it—and also with supernaturalism, that which seeks for the explanation of the world in powers that are in their nature distinct both from man and from the world in which he lives."

Dr. Mackenzie has discovered several different interpretations of the term humanism. Of these, three distinguishable current meanings seem to him important to recognize. I give his account of these meanings in brief: The first sense is that in which it simply means that special emphasis is to be laid on the study of human life. It is in this sense that Socrates may be taken as the typical humanist. But it is not possible to rest here. No one who studies the world scientifically can divorce man's life from other things, and treat it in a way that is exclusively its own. Man is, in some sense, a part of a larger whole, and can only be properly understood in relation to that whole. Hence we are led on from this first interpretation of humanism to a theory that maintains that the world as a whole is to be interpreted from the human standpoint. But this again may either mean that the world is to be somehow explained away, as being an illusion, an appearance, or something of which nothing can be known; or it may mean rather that the world is to be regarded as having a kind of reality, but that in the last analysis it must be interpreted in relation to human life.

I think everyone will heartily agree with Dr. Mackenzie that the last of these interpretations is the only one that can ultimately be accepted as philosophically satisfactory, and we should gladly concede that in this sense the term almost loses its specific meaning, and must be no longer opposed to naturalism. Humanism in this larger view, 'seeks to include the facts of the natural world, and to give them a

place as aspects of reality, though subordinating them to conceptions derived from the study of human life.'

In the chapter on the Growth of Humanism, the author has reviewed the familiar landmarks in the history of philosophy. As a point of view contrasted with Naturalism, the author rightly tells us that Humanism is found far back in the history of philosophy. He sees 'the finest and most characteristic expression of the humanistic position' in ancient Greece. "Humanism is the attitude of mind which seeks the key to the world in the life of man, or, at any rate, the key to man's life within himself."

In the chapter on Humanism in Philosophy the author contends that that which chiefly gives significance to the contrast between Humanism and Naturalism — that is, between the vitalistic and the mechanical view of the world 'is the presence of elements that require a teleological explanation in the former, and the absence of such elements in the latter.' There is, of course, nothing new or striking in this view. The author has aimed simply to state in a modern popular form the old distinction between efficient and final causes. The teleological humanistic world is a world of qualitative judgments; it is a world of values. The mechanical naturalistic world is a world of quantitative judgments of fact. Dr. Mackenzie agrees with Ward, Royce, Bradley, and others, that the category of quantity is not the sole sovereign principle of our human nature.

Dr. Mackenzie uses the term humanism throughout, as the antithesis of naturalism, as expressing the point of view that tries to interpret man in his own light, and the universe in the light of man; whereas naturalism seeks rather to interpret the material universe in its own light, and man in the light of the material universe. And yet, he recognizes that, while these two positions may be regarded as opposed, there is a third, viz., the position of supernaturalism, which seeks the explanation of the universe, or of its most important aspects, in something that transcends both nature and human life.

In the last chapter, the author has given a clear and concise account of his general philosophic position, which may be briefly summarized. He believes that there are only four possible explanations of life. It must be explained (1) from within, or (2) from something still higher than itself, or (3) from something entirely beyond the reach of our experience, or (4) that it must be incapable of any explanation at all. These alternatives give rise to (1) humanism, (2) some kind of supernatural revelation, (3) agnosticism, and (4) pure scepticism. The last is the refuge of despair. The second and third, are hardly distin-

guishable from it, except in so far as they yield some positive principle for the explanation of our life in this universe. But a principle capable of throwing light upon our experience obviously cannot be altogether beyond the reach of our experience. In fact, we find that both agnostics and the adherents of the various forms of revealed religion are continually stating their ultimate explanations, in modes that are essentially humanistic. "On the whole, therefore, we seem to be led to the conclusion that some form of humanism is the only possible method of making our universe intelligible to ourselves."

It is evident that by humanism Dr. Mackenzie after all means hardly more than what is ordinarily connoted by the term Idealism. As a popular contribution to the philosophy of concrete Idealism, these lectures doubtless served their purpose well and in their printed form they will continue to help counteract the current 'veiled materialism.' There is, throughout, a wholesome insistence upon the doctrine that we cannot finally cut off our human life from the rest of the universe and treat it as something to be understood entirely in its own light.

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### PERSISTENT PROBLEMS OF PHILOSOPHY.

*The Persistent Problems of Philosophy: An Introduction to Metaphysics through the Study of Modern Systems.* MARY WHITON CALKINS, Professor of Philosophy and Psychology in Wellesley College. New York, Macmillan Company, 1907. Pp. xxii + 575.

In the title of this work, in the preface, in the introductory chapter, and occasionally elsewhere, there is a lack of precision in the use of the terms 'philosophy' and 'metaphysics.' Among the most fundamental and persistent of philosophical problems are those relating to knowledge and to values, the epistemological and the 'ethico-aesthetico-religious' problems. It is quite clear, however, that it is not Professor Calkins's aim to deal with these problems. She does not aim to give us a general introduction to philosophy, either in the form of a discussion of its persistent problems or in the form of a history of modern philosophy; but to give us an introduction to *metaphysics*.

The main problem of metaphysics is declared to be the nature of the 'all-of-reality.' Concerning this 'irreducible all-of-reality,' two questions suggest themselves: one as to its qualitative character, of *what sort* is it, idealistic or non-idealistic; the other as to its quantitative character, is it one or many, monistic or pluralistic. But as metaphysical idealism may, in turn, be either phenomenalist or per-

sonalistic (spiritualistic), the main problem of metaphysics divides into three: the problem as to whether reality is numerically one or many, the problem as to whether it is qualitatively idealistic or non-idealistic, and the problem as to the interpretation of idealism in terms of selfhood. It is with these metaphysical issues that this book concerns itself, both in its historical and in its more constructive portions. All modern systems are, the author holds (pp. 9-10), naturally grouped in harmony with these distinctions, and the possible types of doctrine are exhausted in the systems from Descartes to Hegel inclusive.

The body of the work consists of four parts. We have first expositions and criticisms of the 'systems of numerical pluralism': the pluralistic dualism of Descartes (ch. 2), the pluralistic materialism of Hobbes (ch. 3), the pluralistic spiritualism of Leibniz (ch. 4) and of Berkeley (ch. 5), the pluralistic phenomenalist idealism of Hume (ch. 6). We next have a 'criticism of preceding systems': the critical philosophy of Kant (ch. 7). Then follow expositions and criticisms of the 'systems of numerical monism': the monistic pluralism of Spinoza (ch. 8), the advance toward monistic spiritualism (personalism) of Fichte, Schelling, and Schopenhauer (ch. 9), and the culminating monistic spiritualism of Hegel (ch. 10). The 'conclusion' (ch. 11), on contemporary systems, devotes some fifty pages to an independent discussion of 'the issue between pluralistic and monistic personalism.'

Following the body of the work is an elaborate and very useful appendix (pp. 457-564), consisting of bibliographies of modern writers on philosophy and of discussions, chiefly relating to portions of Spinoza's *Ethics* and Kant's *Critique* not considered in the body of the work, but including an interesting note on the order of the Hegelian categories.

As regards the style of the work, one may not like the author's frequent use of nouns as adjectives ('nature forces,' 'extension modes,' etc.), nor her fondness for hyphenated adjectives ('more-than-temporal,' etc.) and hyphenated nouns ('idea-plus-the-bodily-change,' 'that-which-is-thought-of-as-existing,' etc.). Still the style of the book, on the whole, is clear, straightforward, forcible and dignified. The book is extremely readable; there is not a dull page in it.

From her fondness for the balancing or weighing of arguments and for judging systems by the cogency of their argumentation, Professor Calkins at times gives the reader the impression that she conceives the business of metaphysics, after the fashion of the seventeenth century thinkers, to be the formulation of chains of arguments or demonstra-

tion of theses, instead of (as it is) the interpretation of experience, the solving of problems.

Professor Calkins lays stress upon the exhaustive character of her classification of metaphysical systems, and insists, as already stated, that all possible distinctive forms of doctrine are exhibited in the historical systems from Descartes to Hegel inclusive. While her scheme of division is undoubtedly suggestive, many will question the exclusive claims which she puts forth on behalf of it. Locke is excluded from treatment on the ground of the substantial identity of his system with that of Descartes, while the systems of Kant, Fichte and Schelling, 'as internally inconsistent, fail,' we are told, 'to represent any one type of philosophy' (p. 10).

The expositions and criticisms of the various systems are admirably clear, forcible and suggestive. These expositions and criticisms give evidence of the author's thorough familiarity, at first hand, with these systems. Copious references and citations greatly enhance the expositions and criticisms, and encourage the reader to turn to the original sources themselves. In a history of philosophy or of metaphysics one may naturally look for rounded and relatively colorless reproductions of past systems. Professor Calkins, however, exhibits marked independence and originality in her handling of the various systems. She often frankly and openly deviates in her expositions of a system from its author's own order of thought, passing over briefly positions which the author of the system made prominent, and emphasizing others left by him relatively unemphasized. This originality and independence of treatment and the fact that each system is studied primarily in reference to its teaching on the metaphysical issues named above, make the chapters all the more readable and suggestive; while they make it impossible to regard the expositions as colorlessly faithful historical reproductions.

In view of the author's acknowledged free handling of the systems she discusses and her specific aims, it would, perhaps, be unfair to criticize her expositions in detail. Her interpretations, however, of the systems of Spinoza, Hume, Schopenhauer and Kant, in some of their fundamental aspects, will certainly not pass wholly unchallenged. Spinoza is interpreted as teaching that God is self-conscious (pp. 297, 305); and as conceiving the attributes (294) in a way which undermines the fundamental unity of substance. A positive metaphysic is found in Hume which gives him almost the character of a great constructive thinker. Schopenhauer is interpreted as holding to a self-conscious and personal Absolute (343, 359); and his pessimism is

dismissed as a mere corollary or off-shoot of his metaphysics (352, 357). While of Kant it is declared that his system includes 'no teaching new to philosophy' (197), and that 'there is little which he taught that cannot be discovered better stated in the doctrines of predecessors or of successors' (198, cf. 272-273). The exalted estimate of the achievements and merits of Hegel may be accepted by Professor Calkins's fellow Neo-Hegelians, but will hardly be by others.

As to the positive teaching of the book, its great merit is the prominence given the doctrine of self-hood. The author's able defence, in her psychological writings, of a 'psychology of selves,' is here admirably supplemented. Throughout the book stress is laid on the fact that 'the immediateness of self-consciousness is the starting-point of all philosophy, the guarantee of all truth' (409). The question fundamental to all philosophy is declared to be, is there a self which underlies evanescent psychic phenomena, a unique and identical real agent which underlies and unifies distinct perceptions (cf. 189, 190, 186)? One of the most significant tendencies in contemporary philosophy, we are told, is the emphasis upon the truth of personality (109); while 'the most hotly contested of the modern philosophical issues' 'concerns the ultimate distinctness of selves' (411). The great problem is 'the problem of the nature, the number, and the relations of conscious selves' (407).

The discussion of this issue as between numerically pluralistic and monistic personalism in the concluding chapter (ch. 11) is one of the crowning excellencies of the book. Nowhere else, perhaps, can the reader find this great issue so simply and clearly presented. The utmost frankness and directness is shown; with no attempt to cloud over the issue by hazy phrases. The author's very frankness of statement in presenting her own Neo-Hegelian position, which is essentially that of Professor Royce (cf., however, on this point, the note on p. 435), and in arguing for it, is deserving of all praise. Such frankness of statement reveals, however, as nothing else could, the inherent difficulties, not to say contradictions, of the position itself. For example, to admit that 'in so far as I am self of the moment, *I now*,' a 'now-self,' a '*self-now*,' I am a self which is 'not identical with the absolute,' 'I am different from the absolute self,' so different indeed that I 'may really be free,' 'may or may not conform to absolute will,' 'am free to be good or bad' (451-452), is to admit what can never be satisfactorily explained, or explained away, by the mere addition of more time or even of eternity. Again, to assert an analogy between the Infinite Self as the includer of all finite selves and the finite self as

'the includer of perceiving, thinking, and feeling experiences' (419), is to overlook the most essential characteristics of selfhood; for a self is aware of its unique oneness, is self-conscious agent, is conscious of freedom, has duties, and possesses rights. While to say that I am 'really free, but free only from the partial, momentary point of view' (452); and to talk of 'choice in opposition to the absolute will' which 'is, ultimately, a subordinated element in the absolute will' (451), is to assert in one breath what is denied in the next.

In conclusion, one can safely say that Professor Calkins's book will interest and benefit the general reader as well as the professional student of metaphysics. By centering attention upon a few fundamental problems and studying these as handled by the great systematic thinkers and on their own merits, ignoring side issues, she has accomplished more than she could have done had she attempted to deal with the whole round of philosophical, or even of metaphysical, problems, and has given us an admirable introduction to contemporary discussions in metaphysics.

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### PRAGMATISM.

*Pragmatism. A New Name for some Old Ways of Thinking.*

WILLIAM JAMES. Longmans, Green, 1907. Pp. xiii + 309.

If Professor James had written his book on pragmatism in the form of a technical treatise addressed to students of metaphysics and epistemology, I should not have ventured to review it. But he has tried the very unusual experiment of expounding his philosophical positions to a lay audience and it seems quite proper that there should appear among his reviewers some who read the book with interests other than those of the special student of metaphysical systems.

Furthermore, it must have impressed itself on every reader of current philosophy that the pragmatists have broken away from the ontological attitude and have taken up the problems of truth and knowledge from a distinctly psychological point of departure. The student of psychology has, therefore, a lively interest and sympathy for such a body of doctrine as that which James advances, and he will hardly be charged with transgressing the proprieties if he records a psychologist's reaction upon James's pragmatism.

The first chapter of James's book might be entitled the psychologist's view of the philosopher. Here Professor James tells us that 'temperaments . . . determine men in their philosophies, and always

will' (p. 35). One's own temperament is often unnoticed and yet it is 'the potentest of all our premises' (p. 8). This general statement is made vivid by contrasting the rationalist and the empiricist who face the world with such totally different subjective preparations for knowledge that it is quite impossible to think of them as seeing the world alike. The rationalist looks for system and unity, he is characterized by idealistic, optimistic, and religious tendencies. The empiricist, on the other hand, is not so much interested in broad sweeping generalizations as in individual observations and narrow groups of phenomena. The empiricist is more likely to feel the keen edge of particular cases of suffering and to be pessimistic and even irreligious.

There is another contrast in philosophers that one may add to this which James points out. Some thinkers have such vivid images of external realities that they cannot tolerate any scheme of thought which does not treat these external entities as primary. With such ontologically minded persons experience is always a secondary affair, valuable only because of what it reflects or implies. On the other hand there are the thinkers like James who are more interested in the processes of conscious experience. The mechanism of consciousness is vivid with them. Ideas lead to intense determinations or are modified and even suppressed in the clash of conflicting experiences. The world is a world of aspirations, and of efforts to untangle the snarl of experience. Every item of mental life is a matter of first class importance. Ontology to such a mind is remote, or recognized as altogether unattainable; to speak of it with assurance seems ridiculous. Truth and reality are within one's experience, not somewhere in the empyrean.

Once we recognize this distinction between philosophical temperaments, the fundamental difference between James and the absolutists is easier to understand. James is constantly asking himself what is the character of this or that idea within experience. If a given idea does not modify the stream of mental life, it has for James no significance or value. If on the other hand, an idea so rearranges experience that the stream of thought and desire takes a new course, then that idea is a potent reality. Truths clash with each other, and out of the conflict come forth new truths. Reality is constantly renewed in experience. To the thinker who starts with ontological standards all such statements are inverted. For the typical ontologist the struggle among ideas is real enough but it is secondary; the ontological standards are unmoved by the struggle. When James says that matter and God are equally valid concepts with which to explain the past, and that the concept of God as the cause of happenings in the world is only more valid

because the concept God promises more for experience than could the concept matter, the absolutist with his eye on ontological matter and an ontological God, shudders at the sacrilege and shallowness of the pragmatist.

To be sure the absolutist must admit that his idea of God is indeed subject to development and correction. He must admit that the history of the race and of philosophical systems shows that no man has ever been in contact with the absolute and that many have professed to be whom later generations of absolutists have repudiated; but in spite of all these reasons in favor of a lenient attitude toward a doctrine which regards truth as a progressive development of experience, the absolutist will have his ontology rather than the pragmatist's primary experience.

To the psychologist who stands outside the currents of philosophical discussion, the disputes about the nature of truth which are now being carried on by the pragmatists and rationalists are due to those 'potest of our premises,' the temperamental variations in ability to envisage external realities.

With this insight into Professor James's purpose we are fully prepared to receive the definition which he gives of pragmatism. It is an attitude, or a method, or a mode of defining truth. In his successive chapters, Professor James makes this clear by coming back to the nature of truth as his central problem. Some of his definitions of truth may be quoted. Thus in his second chapter he writes : "*ideas (which themselves are but parts of our experience) become true just in so far as they help us to get into satisfactory relation with other parts of our experience*" (p. 58, author's italics). In his sixth chapter, which is given up to the problem of truth, various other definitions of truth are given. "*Truth happens to an idea. It becomes true, is made true by events. Its verity is in fact an event, a process : the process namely of its verifying itself, its veri-fication. Its validity is the process of its valid-ation*" (p. 201, author's italics). Or again, "*'the true,' to put it very briefly, is only the expedient in the way of our thinking, just as 'the right' is only the expedient in the way of our behaving*" (p. 222, author's italics).

Such accounts of truth must certainly face the criticism that they tend to degenerate into pure subjectivism. Professor James attempts to avoid subjectivism by recognizing a certain amount of truth which is 'funded.' There are certain beliefs which are behind all our ordinary experiences and as 'common sense' these established categories challenge every new experience and determine the acceptability of the new idea into the total system. To be sure the stock of common

sense ideas is constantly undergoing revision in view of new experiences and the 'common sense' of the next generation will not be the same as ours, for our successors will have the advantage of our revisions. Even the 'funded' truth is accordingly a product of development within experience.

There can be no doubt that here Professor James is [face to face with one of his most serious problems. If common sense has a kind of independent reality, his truths may be rescued from that subjection to temporary and trivial expediencies which many have charged against them. If a new idea is verifiable only in view of established canons of common sense then indeed experience has a background which gives the momentary verification more than passing value.

Professor James's account of the origin of common sense categories is the same as that adopted by Schiller. The original concepts of common sense were discovered, he says, by prehistoric geniuses. The common man evidently does not have the mental machinery to coin these fundamental forms of thought. We are all dependent, therefore, for the organization of experience upon the standards set by our more illustrious forefathers. The individualism which everywhere else characterizes James's treatment of experience is here curiously subordinated to external influence. Why James does not recognize what Hobhouse has called 'practical judgment,' and treat the concepts of common sense as products of universal individual efforts to react successfully in ordinary life, is difficult to understand. Genetic psychology is so familiar with forms of development which require a universal agreement in matters of reaction and perception that James seems to have lost a good opportunity here of reinforcing his pragmatic doctrine of truth by a strictly evolutionary account of the foundations of common sense in practical activity. To import so foreign an element into individual thought as the invention of some superior genius is a procedure which should at least be defended in detail if it is to escape the criticism of being a short cut across a very difficult part of the journey.

There is more in the book than the discussion of temperaments and the nature of truth. James is after all some sort of a realist. In his preface he states explicitly that "there is no logical connection between pragmatism, as I understand it, and a doctrine which I have recently set forth as 'radical empiricism.' The latter stands on its own feet. One may entirely reject it and still be a pragmatist" (p. ix). Later (p. 54) he quotes with approval Papini's remark that the pragmatic method may in the hands of various thinkers lead to totally different consequences. One may be led by his application of the prag-

matic method to agnosticism, another may be led to idealistic metaphysics. When, therefore, we find James leading us by the application of the method to an optimistic view of the world, when we find many phrases which show his realistic conclusions, we have to recall his own warning and recognize that these consequences of pragmatic philosophy are not necessary, but are peculiar to his special type of thinking.

Such a distinction between James's pragmatism and his other philosophy is not easy to draw. It is very doubtful indeed whether the majority of James's readers will distinguish between the pragmatic method and the pragmatist's conclusions. Indeed, most readers will be satisfied to accept the exposition of method as true because it leads in the hands of the master to conclusions which satisfy the general desire for optimistic and clearly ontological results. James is no sceptic in his results. The fullness of the world of substance and design, and the most hopeful belief in the absolute are brought back in the end. The most ontologically minded reader is likely to get all the reality he can carry away. The professional ontologist is therefore likely to cry out against all this show of pragmatism and experience which in the end turns out so fully equipped with reals. The answer to exultant ontologists is, it seems to me, repeatedly suggested in the book, though I have not found in their criticisms of pragmatism any very clear evidences of their apprehension of the answer. James says, with all clearness, that the realities to which we are led by experience are all subject to revision, they are not the standards. What ontologist could say with James, reject if you must *my* reals, *my* truths, but build up your own by testing your conclusions, as I have mine, by their 'cash value' in life? An ontology which is pragmatically reached and held as a tentative conclusion is different from an ontology which goes before experience and adopts as its fundamentals noumena before phenomena.

Why pragmatism gets a hearing is clear enough to see when one heeds this warning of James not to confuse his realistic conclusions with his method. The method of revision and re-revision is the method of all science. The idea of an evolving truth is congruous to the whole modern attitude as determined by the doctrine of evolution. All science is willing to postpone indefinitely its ontology and to define its truth as a system of working hypotheses. If it is objected in some quarters that philosophy ought to go further than science and get nearer to ultimate reality, the scientist is likely to turn a deaf ear to such objections and to adhere to the philosopher who tells him as does Pro-

fessor James, that the method of science and the method of philosophy are the same. That Professor James goes further and applies his methods and reaches certain conclusions of an ontological character is not likely to disturb the scientist so much as it does the dissenting metaphysician, for the scientist is sure to take at its face value Professor James's assurance that everyone is to apply the method for himself and to accept those truths which he can verify and absorb in the course of his own experience.

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### THE ROOTS OF REALITY.

*The Roots of Reality.* ERNEST BELFORT BAX. London, E. Grant Richards, 1907. Pp. xii + 331.

The central purpose of this book is to establish the alogical as an ultimate element of reality. The author's general position is avowedly idealistic. He regards as impregnable truth the thesis 'that reality is synonymous with conscious experience possible or actual.' But in opposition to Panlogism, which is condemned because it would reduce the world to a system of pure-thought-forms, he finds it necessary to distinguish within consciousness-in-general antithetic logical and alogical elements. By 'logical' he designates the categorizing thought-form; by 'logical' the datum or matter which is categorized. These elements are said to have a difference not merely of degree but of kind.

The essay bearing traces of the strong influence upon the author of the systems of Fichte and Schopenhauer has also a close relationship with certain contemporary philosophic movements. It exhibits an attitude of thought which has points of similarity with the Pragmatists who, while emphasizing the active character of mind, have recourse to a *δεκτική τοῦ εἰδους* — to an as yet uncategorized feltness — as the material of the constructions of concrete experience. It has points of similarity, likewise, with Realists who lay stress upon the datum aspect of experience as a factor never absorbed by thought relations. The author differs, however, from both Pragmatist and Realist, in that, while he emphasizes the datum-aspect of experience and declares that the grounds of reality comprise the potential as well as the actual, his general standpoint is avowedly idealistic. All reality, he holds, must ultimately reduce to consciousness actual or potential.

The author in developing his theory of reality takes as starting-point the generalization which he regards as ultimate, namely, consciousness as such. For all objects of knowledge and all judgments

about them are determinations of consciousness, either possible or actual. Turning to ordinary consciousness he analyzes every concrete experience or reality into two antithetic elements, viz., 'feeling or sensation' and 'form or category.' The feeling element is characterized as primary and immediate; the determinate thought as secondary and mediate. The primary feltness is altogether 'alogical'; the determinate thought arises through mediation of the alogical factor by the 'logical' form or relation. Every concrete experience or reality is a synthesis of these antithetic elements. The alogical datum cannot be reduced to the logical category or *mere* relation. For every relation presupposes terms which are related. These terms are simply *given*. Mere thought can never give them; nor can it adequately express or represent them. By its very nature the alogical is capable only of being immediately felt or simply indicated. Conceptual thought can neither present nor portray it.

The object of thought, then, is a synthesis of logical and alogical elements; it is immediate feltness categorized under an intelligible form. This process of relating thought is found to involve and to imply an apperceiving subject or ego. Within this subject are also found the antithetic logical and alogical elements. The empirical ego implies a pure ego—for the subject has a *thisness* which thought-forms can never absorb. This immediate aspect of the conscious subject points to a 'subject-in-general' which is its ground—which in last analysis is the '*materia prima* of consciousness.' Since the world is a system of differentiations of the subject-in-general the subject and object of a determinate experience cannot be utterly disparate. In some sort the alogical datum no less than the logical form must have its ground in that subject which is the potentiality of all consciousness. Thus the ultimate ground of all experience is found in the subject *per se* "out of which all consciousness wells up—including that objectivity which is no more than otherness of the subject itself."

The distinction between the alogical and the logical naturally dominates the author's discussion of special concepts and problems of philosophy. Reality—the concrete synthesis of alogical and logical elements—is constituted by the manifestation or appearance of Being. Being is not identical with Reality, but is attributed to whatever has potentiality of consciousness. The conscious individual is regarded as a manifestation or fixation of consciousness in general. Although the subject-in-general appears thus under the form of individuation its own personality is doubtful. Philosophical analysis yields no answer to the question whether the ultimate subject is realized only in minds

such as the human, or is realized as concrete self-consciousness apart from such persons. Here, the author concludes, the philosophical attitude must be agnostic. The distinction between *reality* and *truth* also leads to the conclusion that philosophic knowledge can never exhaustively apprehend reality. For reality is a synthetic union of logical and alogical elements and truth deals with the logical. While reality is concrete, truth is abstract. Truth then can merely symbolize the alogical factor in reality.

Ethics and æsthetics, like metaphysics, are said to rest ultimately upon an alogical apprehension whose immediately given content cannot be formulated in thought. In conduct the end is determined by feeling which, as contrasted with reason, is alogical. Rationality defined as 'the mere knowledge of the relation between means and end' is held to be determined by the *felt* desire. Reason thus is always a means never the end itself. Since, in motive, feeling is always the ultimate fact the ought is alogical. Likewise the evaluation of beauty and ugliness is arbitrary, since its basis is alogical feeling which cannot be reduced to reason. However, in both ethics and æsthetics, given the alogical ground there can be constructed a logical system of formulae constituting a canon.

To the question, "What is the ultimate purposive goal?" the author's answer is that it cannot be an Absolute conceived as pure actuality. Such an Absolute would constitute a '*stasis*' excluding all 'becoming.' In view of the waning emphasis upon the individual and the waxing significance of the social, the author inclines to favor as *telos* a kind of social *megazoon*. To this evolved social '*persona*' individuals would sustain a relation similar to that of cells to a physical organism. But if one reject this *telos*, the ideal as a perfect Absolute is precluded by the fundamental antithesis of good and evil. Though particular evils pass 'the potentiality of evil' abides. Nor can one formulate in thought the *telos* of the conscious process. There is however discoverable "a gradual harmonization of the system within systems of which the world of consciousness consists."

The value of this essay as a contribution to philosophy lies in its lucid and in general consistent presentation of the claim to a place in the scheme of reality of a factor which never reduces to *mere* relation. The individual objects of experience involve a fusion of universal and particular. The emphasis laid by Mr. Bax upon the inevitable particular has worth in view of the strong tendency of idealists to resolve reality into its purely formal aspects. In seeking a check for an highly abstract Panlogism, however, the author seems at times to approach

realism more closely than is consistent with his idealistic basis. In the endeavor to make clear-cut the antithesis between datum and conscious-relation he appears to hold form and matter too widely apart. With an alogical ego and an alogical sense-datum in irreducible antithesis to a logical relation, one marvels that the relation ever succeeds in making connections—and indeed that the relation ever arises. Nor, in view of the emphasis laid upon this fundamental antithesis is the puzzle as to *how* this realistic chasm is bridged solved by the assertion that the common ground of the antithetic alogical and logical ‘creates in its self-differentiation as subject-object that element of relativity necessary to all experience.’ This assertion is inadequate as an explanation of the ground of the logical factor—the thought relation. In the attempt to correct those systems which, because of an exaggerated emphasis upon the formal aspect of reality, remove all ground of the datum-aspect, the author simply reverses the mistake. In his emphasis of the alogical he removes the ground of the logical. It is simply said to arise in self-differentiation of the ultimate subject. And yet this self differentiation is regarded as merely a blind or alogical impulse.

In this problem of self-differentiation of the ultimate subject centers another defect of the author’s argument. The ‘dynamical process of reality’ of which he speaks is defined as blind impulse. But because it grounds the logical there is a constant tendency to apply to this process terms which are properly applied only within the personal sphere. He defines the Absolute as ‘principle merely, timeless principle of eternal change in time.’ But it is also called ‘a *self-realizing* unity of simple tendency and direction.’ Here personal attributes seem to be predicated. Predicates of personality are further implied in the assertion that in this ‘potentiality of self-realization eternally inherent in the world process’ is to be found ‘the higher meaning of reality.’ This evaluation of the world process seems to lack adequate ground. One would like to know how the universal impulse whose source is beyond the realm of personality and of morality acquires this *higher* significance in the individual consciousness. Such evaluation implies an objective standard of progress and perfection. This surely is not supplied by the author’s *telos*, for his social organism is as pure an abstraction as Panlogism has ever been guilty of. Nor is it supplied by a mere *blind*-impulse. And yet because the perfection sought by individual persons is defined as ‘asymptotic’ the authority of the *telos* would seem to have its source beyond the finite realm. Thus the author’s evaluation of the world process appears to

lack adequate basis unless he admit that the ultimate subject is consciously self-directing rather than blind.

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### REALITY AND TRUTH.

*Reality and the Criterion for the Truth of Ideas.* JOHN DEWEY.  
Mind, 1907, XVI., 317-342.

Mr. Bradley's argument from the formal requirement of consistency of thought to the actual self-consistency of reality, like every form of the ontological argument, rests upon the question-begging intellectualist assumption that thought has a function independent of other functions of life. The contradiction involved — that when thus isolated thought, even according to Mr. Bradley's contention, is internally discrepant and therefore, one would suppose, does not conform to its own standard of consistency, to say nothing of endowing reality with such consistency — would disappear if consistency, as the end and test of thinking, were assumed to mean the harmony attained when an idea of harmonious order is used as formative plan of action by which real oppositions and incompatibilities, otherwise stubbornly persistent, are brought into peaceful and satisfactory coöperation. This would mean that thinking assumes the consistency of reality, not as a fact about reality in general, but as an ideal, attainable through thought-directed activity, for the specific realities that are given as discrepant. The facts of experience make for this view of the practical nature of consistency. The 'collisions' recognized by Mr. Bradley are such to the intellect only because they lead to defeat of purpose; in them reality is not irrational, but it is as yet non-rational. The reflective or logical is a statement of this conflict. The judgment gets material for its subject from the discovery of the nature of the conflict, and for its predicate from the conception of the nature of the object in which the conflict would be terminated. The subject, which is existential because reminiscent or recording, and the predicate, which is meaning or ideal because anticipatory, are thus necessarily correlative, but only within the field of the practical problem with reference to which they arose. Capacity of guiding to the termination of this specific conflict is the measure or criterion of truth. The term truth is sometimes applied to the terminal reality as if that were the criterion apart from the practical situation. But truth in its only intelligible sense is a character of ideas, hypotheses, judgments, whatever involves intellectual statement, and its criterion is the worth of such statement as intellectual, *i. e.*, as

organizing blind action into victorious plan. The working of an idea is not cause of its truth; rather, such working is itself the truth of the idea. To say that the idea was true even before it succeeded can mean only that as a matter of fact it did succeed. The confusion in the use of the term truth is due to cases in which an idea does not cease to exist as idea as soon as it is made true, but functions in the development of other ideas. Ideas that have a constant or recurring function are 'eternal' truths, which however are not unchanging, but must live and grow on pain of becoming noisome and false.

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## BOOKS RECEIVED FROM APRIL 5 TO MAY 5.

- The Philosophy of Loyalty.* J. ROYCE. New York and London, Macmillan, 1908. Pp. xv + 409.
- La Pensée et les Choses. I. La connaissance et le jugement.* J. MARK BALDWIN. Paris, Doin, 1908. Pp. xviii + 500. 4 fr.
- Lessons of the Financial Crisis.* Various authors. Philadelphia, Amer. Acad. Polit. and Social Science, 1908. Pp. vi + 233.
- L'Idéal moderne, la Question morale.* P. GAULTIER. Hachette, 1908. Pp. viii + 358. 3 fr. 50.
- Croyance religieuse et Croyance intellectuelle.* OSSIP-LOWRIÉ. Paris, Alcan, 1908. Pp. 176. 2 fr. 50.
- Nursing the Insane.* C. BARUS. New York, Macmillan, 1908. Pp. x + 409.
- La Psychologie quantitative.* J. J. VAN BIERVLIET. Gand, Siffer; Paris, Alcan, 1907. Pp. 219. 4 fr.
- Antiquities of the Upper Gila and Salt River Valleys in Arizona and New Mexico.* W. HOUGH. Washington, Gov. Print. Office, 1907. Pp. 96.
- The Influence of Alcohol and other Drugs on Fatigue.* Croonian Lectures. W. H. R. RIVERS. London, Arnold, 1908. Pp. 136.
- The Application of Statistical Methods to the Problems of Psychophysics.* F. M. URBAN. Philadelphia, Psychol. Clinic Press, 1908. Pp. ix + 220.
- Historia de la Filosofía Española des los tiempos primitivos el*

*Siglo XII.* A. BONILLA Y SAN MARTIN. Madrid, Suarez, 1908. Pp. 473. 8 pts.

*The Will to Believe as a Basis for the Defense of Religious Faith.*  
E. STETTHEIMER. Arch. of Philosophy, No. 2. New York, Science Press, 1907. Pp. vi + 97.

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## NOTES AND NEWS.

PROFESSOR WILLIAM JAMES has sailed for Oxford, England, where he is to give a course of eight Hibbert lectures on Present-day Philosophy before Manchester New College. Before his departure he was presented with a handsomely bound copy of the volume of papers prepared in his honor by the members of the department of Philosophy of Columbia University. The volume has now been published by Longmans, Green & Co., under the title *Essays, Philosophical and Psychological*.

AT the George Washington University Williston S. Hough, Ph.M., has resigned from the department of philosophy and has been elected Professor of Psychology and Pedagogy. Edward E. Richardson, Ph.D., has been elected Instructor in Philosophy in the same University.

PROFESSOR J. J. McNULTY, of the College of the City of New York, was killed in an accident on May 1.

DR. I. WOODBRIDGE RILEY, late Johnston Scholar in the Johns Hopkins University, has been appointed professor of philosophy in Vassar College.

PROFESSOR ARTHUR O. LOVEJOY, of Washington University, St. Louis, has accepted a call to the chair of philosophy in the University of Missouri.

THIS number of the BULLETIN, dealing especially with philosophy, has been prepared under the editorial care of Professor C. M. Bakewell.

THE following are taken from the press :

A NEW psycho-neurological institute, under the direction of Professor Bechterew, was recently opened at St. Petersburg.

MR. H. L. HOLLINGWORTH, assistant in psychology in Columbia University, has been appointed instructor in psychology in the University of Nebraska.

## THE

## PSYCHOLOGICAL BULLETIN

IMITATION IN MONKEYS.<sup>1</sup>

BY PROFESSOR JOHN B. WATSON,

*University of Chicago.*

The literature dealing with natural history abounds in anecdotes concerning the imitative power of monkeys. Thorndike, in his experimental study of the mental life of monkeys, denies that imitation plays an important rôle in the life of the primates. Students of behavior were inclined to accept the conclusions of Thorndike until Hobhouse's experiments were reported. As is well known, the latter finds that many animals, especially the monkey, learn both by 'perception of result' and by imitation.

Believing that a thorough reworking of the field was desirable, I began experiments upon four monkeys in the summer of 1906. From that time on to the present, the behavior of these monkeys has been observed incidentally under environmental conditions more or less resembling those offered by their native habitat, as well as under conditions of experimental control. In taking up the study, several essential factors were kept in mind. In the first place, the animals were purchased shortly after importation. They were kept, under the best conditions of housing, until they had become used to handling and until a complete knowledge of their repertoire of 'chance associations' had been obtained. Hobhouse experimented upon garden monkeys whose opportunities for the formation of coördinations of the most diverse kind had been legion. This fact, coupled with his rather loose type of experimentation, is enough to make one accept his somewhat eulogistic conclusions with a grain of caution.

<sup>1</sup>This MS. was prepared essentially in the present form for presentation before the Western Branch of the American Psychological Association in October, 1906. For a statement of recent literature upon imitation see review section of this number of BULLETIN, edited by the present writer.

In the second place, the animals were kept under normal conditions of hunger. During the period of experimentation, they were fed the usual amount of food. The stimulus used was always some form of food for which the monkeys had a special fondness, such as malaga grapes or bananas. These animals, after having been fed to satiety both with bananas and with bread and milk, will eagerly attack a problem-box if it contains grapes.

The four monkeys were selected from a group of nine on account of their gentleness or alertness. Of these, one was a baboon (*Cynocephalus*),<sup>1</sup> one a capuchin (*Cebus*), while the other two were rhesus (*Macacus*). The first two animals need no commentary. They were healthy and characteristic of their respective species. The two rhesus monkeys have a rather interesting history. Jimmie, a large male, was obtained from an importer; Billy, a small male, was a stray, probably from some circus. He and his mother (?) were found one day in the yard of a large apartment house. At the time, Billy was nursing and was carried everywhere by his mother in the characteristic maternal monkey fashion. On account of the fierceness of the mother, Billy was weaned and put into a large cage which housed Jimmie. An attachment sprang up almost immediately between these two monkeys. At this period of his life, Billy was very wild and restless. When excited, he would cry and attempt to attach himself to Jimmie as he had customarily attached himself to his mother. This Jimmie soon discouraged by severe nips and cuffs. A little later, after the friendship had been established, Jimmie, whenever Billy became excited, would run to him, assume a sitting posture and put his forelegs around Billy's neck. Billy, on his part, would nestle up to Jimmie and clasp him around the chest. If Billy did not become placid under this treatment, Jimmie would gently rock him from side to side and at times would pat him, giving out a soft companionable chatter. This friendship has continued up to the present time.

On account of the peculiar relationship existing between these two animals, a close watch of their daily life was kept. It soon became evident that Jimmie's reactions influenced Billy's to an enormous extent. When Jimmie goes to one part of the cage, Billy follows. If a pan of water or a bowl of milk be held out to them, Billy will come down to drink if Jimmie will precede him, never otherwise. Jimmie has formed the habit of jumping to my shoulder when I enter the cage and call; Billy has formed the same habit, but if Jimmie for any rea-

<sup>1</sup> This animal was so stupid in all his reactions that results obtained from him will not be considered specifically.

son refuses to come when I call, Billy will refuse also. If Billy is loose in the room when I pass with Jimmie on my shoulder, he will run to me immediately when I call, but on the other hand, if Jimmie is not with me, Billy will pay absolutely no attention to my commands. At times, Jimmie and Billy are left loose in the animal room. When I desire to force them to enter their cage, I get a long stick and threaten Jimmie with it. He usually stalks around the cage two or three times before entering it, but always just out of reach of the stick. Billy invariably 'tags' him and when Jimmie finally darts through the cage door, Billy plunges in too. It is almost impossible to force Billy to enter unless Jimmie has preceded him. On the other hand, if Jimmie is left in the cage and Billy is forced out into the room, the latter is unhappy and will reenter the cage the moment the door is opened wide enough to admit him.<sup>1</sup> Both monkeys are restless and excitable when they are in different rooms. At such times calls are frequently made to each other. When again united, they cuddle together in the manner described above, and both chatter in a way which is hard to describe, but which seems to be an expression of emotional satisfaction.

I have entered into a description of the companionship between these two animals, because under such conditions surely, if anywhere, we ought to be able to demonstrate intelligent imitation, provided such a function be possessed by them.

Problems of the manipulation type, and of a type involving for their solution, apparently, the presumable perception of a simple relation, were presented to all of these animals. These latter problems are designed after those employed by Hobhouse. Indeed, in some instances, I have tried to duplicate Hobhouse's conditions.

The following is a partial list of problems presented to each of the four monkeys:

*A. Problems depending for their solution upon the perception of relation:*

- I. Drawing in food with a rake — animal to imitate me.
- II. Drawing in food with a cloth — animal to imitate me.
- III. Obtaining food from bottom of bottle by use of fork — animal to imitate me.
- IV. Pushing out food from middle of long glass cylinder by means of light sticks — animal to imitate me.

*B. Problems of manipulation type:*

<sup>1</sup> As Billy increased in age many of his babyish habits tended to disappear. Recently he has manifested a certain independence in coming to the door of the cage for his food.

V. Old-fashioned latch — animal to imitate *Billy* or me.

VI. Box with door in top — not held in place by any fastening. Animal to pull open door by means of handle — *Billy* to imitate *Jimmie*.

VII. Box with door in top held in place by push-button. Push-button was attached to door and ran through guide in frame of door. Door opened (pulled up) when latch had been slipped back far enough to clear guide — *Billy* to imitate *Jimmie*.

Without entering into details concerning the learning process involved in these problems of the manipulation type, I unhesitatingly affirm that there was never the slightest evidence of inferential imitation manifested in the actions of any of these animals. There was never imitation either of my movements or of the movements of the animal which was successfully manipulating the mechanism. In problems VI. and VII. *Jimmie* almost immediately hit upon the successful movements. For three weeks he procured all of his own food in this way. *Billy*, who had previously easily learned box V., was present ‘watching’ all of his movements, but could never at the conclusion of the tests with *Jimmie* manipulate these boxes alone at his imitation-test (once each day for five minutes or longer, immediately at conclusion of *Jimmie*’s exposition).

*Jimmie* is the quickest animal in learning mechanisms I have ever observed. When a box worked by any variety of mechanism is placed before him, he tests the various movable parts with teeth and paws with lightning-like rapidity. Nevertheless, after watching his young companion manipulate box V. for three days, he showed not the slightest familiarity with the mode of procedure required to open it. He learned it perfectly of his own accord, however, by a hit or miss method, in five trials.

Most of the tests of the manipulation type made with the cebus, Harry, were on box V. At intervals, for over a month, I presented this box to him: I would attract his attention to the food in it when he was within a few inches of the door; and while he was apparently attending to my movements, I would slowly raise the latch and allow the door to fly open. Over 100 trials of this kind were given him during the course of the experiment. During all this time, he failed to profit by my tuition. He was always given his imitation-test immediately after I had opened the box.

Another cebus, lately purchased by me, failed after 60 trials to open a small metal box which is opened by means of a small handle (similarly to VI.). A grape was placed in this box and the lid was

then opened and shut before him several times. Invariably, when he tried to open the box alone, he clawed and bit at the edges of the junction point between lid and box until by chance his movements were successful. Not for the first 60 trials did he use the handle to pull the lid open.<sup>1</sup>

The results from the first four problems, which involve apparently the perception of relation, gave no better indications of the presence of imitation.

Problem I. was presented to Jimmie, Billy and Harry (the *cebus*) at intervals, for more than three months. In detail, the method was as follows: The animal was tethered in an open floor space. A grape was placed out of reach. A light, ten-inch stick with a two-inch T-piece fastened to one end was left near. In order to get the grape, the monkey would have to hook the T-piece behind the grape and pull in. As is known, Hobhouse found that his monkeys (*rhesus* and *chimpanzee*) would use a rake, a crooked stick, and even a piece of cloth for this purpose. I have been wholly unable to verify his results.

When the animal is placed in this situation, it at once begins to strain at the tether and to reach out with the paw as far as possible. All three of the monkeys were given several hundred trials without receiving aid from me. Never once was the slightest effort made to utilize the rake in the proper way. They would often pick up the rake, bite it and then discard it. I oftentimes left them in this situation for hours at a time. The food had never been reached upon my return.

Finally, I began showing the monkeys how to draw in the food. I would wait patiently until I apparently had their attention, then slowly hook the T-piece around the grape and slowly draw in the food. The moment the grape rolled near, the animal began to strain

<sup>1</sup>This box was to be used later as the food box in a discrimination test on spectral light. I thought the test on discrimination would be facilitated if the monkey were allowed to open the box in the daylight. After failing to teach him as above described, I gave up in despair and decided to try him in the discrimination test in the dark room, trusting that the conditions there, offering less distraction, might after all hasten the association. Strange to say, he manipulated the box perfectly from the first trial. The reason was apparent. In the dark room, a faint red light was presented with the box. Under these conditions, the animal began 'peering' about, with his head close to the floor, and accidentally struck the handle with his mouth, and immediately opened the box. Ever afterwards, he adopted this method. Harry, the other *cebus*, also learned to open the box with his mouth. The *rhesus* monkeys, on the contrary, opened it with the paw without any apparent learning process.

at the tether and to attempt to grasp the grape with the paw. The situation was again immediately arranged as before and the rake left near.<sup>1</sup> *Never once did any one of the animals push out the rake, hook the blade around the grape, and then pull in*, nor did they in any other way ever show any signs of perceiving the relation which ought to exist between the two objects. After many tests, the rake became associated with food and the animals began eagerly to pick up the rake and to drag it about the moment I came near with the food, only to drop it, and begin straining to get the food with the paw the moment the grape was put down on the floor. No effort was made to set up the association by the trial and error method, since it was desired to test only the possible presence of a higher form of learning.

The above test was repeated *ad nauseam* and I finally came to the conclusion that Hobhouse must have experimented upon a far more intelligent group of animals than the above; or that he was testing animals which had already learned a variety of such tricks, and consequently the apparently new reactions which he obtained were really due to extremely slight modifications of associations already existing; or, finally, that he was inclined to read more into the monkeys' use of the stick than was really present (the monkey will *pull in* a rope or stick with great rapidity and dexterity). It would be idle speculation on my part to decide among these possibilities.<sup>2</sup>

Problems II., III. and IV. gave identical results. In problem II. the cloth was drawn in if it were anywhere within reach, regardless of whether it were in a position to catch the grape in passing or not. Jimmie was fond of taking the cloth, putting it over his head and then dancing round the room. None of the animals made the slightest effort to throw the cloth out over the grape and then draw in, although they were shown the trick by me many, many times.

<sup>1</sup> At the first test, the monkeys would draw in the stick if it were left near the grape; but they would pull in just as eagerly if the blade was not hooked around the grape as if it were. Indeed, they would strain to reach the stick and pull in even when no food was near. It is an inveterate habit with them to pull in any object which can be reached and manipulated.

<sup>2</sup> To show Jimmie's level of intelligence, it may be worth while to mention the fact that he soon learned that by turning round and facing the tether and using the hind legs instead of the fore legs, he could increase his reach by several inches. In the later trials he adopted this method exclusively, gaining great adroitness in the use of the grasping powers of his hind feet. He succeeded many times in getting the grape because the experimenter would forget Jimmie's 'method' for the moment and would place the grape too near. Billy, his companion, never caught this trick, although he was constantly near Jimmie during the trials.

In problem III. a piece of banana was placed in the bottom of a tall bottle. A stick, roughened and sharpened at the end, was stuck into the banana. The end of the stick protruded from the bottle three or four inches. The animals on their first trial immediately grasped the stick and jerked out the banana. The experiment was then repeated, but the stick was not plunged into the banana. The monkeys as before jerked out the stick, but threw it down immediately and plunged the forearm into the bottle and attempted to reach the food by the more natural method. Not succeeding, they knocked the bottle down and rolled it around until the food dropped out. Jimmie, after several trials, learned to pick up the bottle by the lower end and to shake the food out. I tried patiently to teach them the use of the stick but failed signally.

In problem IV. the animal had to push a piece of banana from the middle of a 15-inch glass cylinder of  $1\frac{1}{2}$ -inch bore. The glass cylinder was securely fastened to a table top. A light 16-inch stick was placed near. The monkeys, on being admitted to the apparatus, immediately began clawing and biting at the cylinder at a point nearest the banana. Later in their first trial, they came to one end of the cylinder and began a frantic struggle to reach the food with the paw. Their own unaided efforts were all of this random type. Day after day I took the light stick, put it into the cylinder and then slowly forced the banana out: The sight of the moving banana made them eager — they followed it down the cylinder until it came within reach of the ubiquitous paw. Meeting no success with this procedure, I changed the method by putting the stick inside the cylinder and just in contact with the banana. The monkey, in order to reach the food, would simply have to force the stick on in. Invariably, after my oft-repeated lesson, the monkey on his imitation-test first jerked out the stick, then began his random instinctive efforts to extract the food by means of his paw.

One other test, involving also for its solution apparently the perception of a simple relation, was given to Jimmie and Billy. Early in the history of their friendship, Jimmie formed the habit of taking Billy's food away from him — going oftentimes even to the length of poking his paw into Billy's cheek pouches. I thought it possible to test whether Jimmie would in time learn to push Billy out for food. The method was as follows: Jimmie was tethered short to one corner of the large living cage; Billy was left untethered but had a two-foot chain attached to his collar.<sup>1</sup> Food was placed in a box in the corner furthest

<sup>1</sup> It needs to be mentioned in this connection that the two monkeys were ordinarily kept in the cages with their chains on but unattached. In their play, consequently, Jimmie had already learned to haul Billy about the cage by using the latter's chain.

from Jimmie. Billy usually remained near Jimmie until food was placed in the box. He would then dash to the box (provided the experimenter would withdraw) and pick up a bit of food. Jimmie would immediately grasp the end of Billy's chain, draw him in and rob him of the food. He became extremely adept in doing this and during a day's experiment (ten to twelve separate tests) Billy rarely kept possession of a morsel of food unless he swallowed it instantly. Jimmie soon began to grasp and to hold the end of Billy's chain the moment I brought in food. The performance of this trick looked at first as though it called for the actual perception of relation on the part of the animal, but closer observation showed that Jimmie would pull Billy back before he obtained food as often as he would allow him to get food before pulling him in. Billy finally learned to circle—to leave from a position where Jimmie could not grasp his chain; after getting the food, he would climb upon a board near the top of the cage. In doing this his chain hung down, whereupon Jimmie would catch the chain immediately and pull Billy down. Billy on his part never learned to keep his chain out of Jimmie's reach.

For three weeks Jimmie was forced to get all of his food in this roundabout way. The next step in the problem was to test Jimmie's behavior when Billy had been surfeited and would no longer go to the food box. In order to arrange this, Billy was taken out and fed until food would no longer tempt him to move. He was then put back into the cage with Jimmie and food was placed in the food box as before. I desired to see whether there would be any effort on Jimmie's part, under these circumstances, to force Billy to go towards the food-box (pushing and pulling Billy about was one of Jimmie's pastimes). Under the conditions mentioned Jimmie would begin immediately to draw in Billy by his chain and to haul him back and forth, but this random activity was all—*there was no tendency present to push Billy toward the food.*<sup>1</sup>

Such are the experiments which closely engaged my attention for about a year (June, 1906 to April, 1907) and incidentally for more than two years. From all this observation, I am forced to conclude that imitation in its higher forms has not been a very powerful or efficient means of aiding the monkey in reaching its present high place in the mammalian series. The reason for the primate's superiority is to be sought for in his greater sensitiveness to an extremely wide range

<sup>1</sup> Nor did Billy ever gratuitously attempt to supply Jimmie with food. Garner states that when one of his pet monkeys became sick, its playmate and companion carried food to the invalid.

of stimuli and to his superb power of muscular response rather than to any ability on his part to construct stimuli into definite objects which can be analyzed and synthesized by him, later, at will.

The above represents the results obtained from my controlled experiments. In my long association with these and other monkeys, I have incidentally observed certain types of reaction which are circular in character and which are suggestive of a low order of imitation. I append examples of these below. The examples chosen are by no means exhaustive.

#### EVIDENCE FOR CIRCULAR TYPES OF REACTION.

*Looking Through a Crack.*—One monkey discovered a hole in a window-frame where a sash-cord had formerly run. This one would ‘peek’ and then another one would push him aside and ‘peek’ in turn. This was observed several times when several monkeys (*rhesus*) were brought up from the dealer for examination and selection. It was later observed in two monkeys which had been in the laboratory for some time (Kinnaman has observed the same type of reaction).

*Dropping a Spoon.*—While the monkeys were at liberty on Bird Key (Dry Tortugas), I was disturbed one day by a noise: I found that Harry (*cebus*) had filched a large tablespoon. He was standing the spoon on one end and immediately releasing it. The dropping seemed to be not accidental but an actual part of the act as a whole. (The *cebus* is extremely adept in the use of his paws.) He repeated the act fifteen times in unvarying order and (as well as I could judge) at definite time intervals. This corresponds, in my opinion, very closely to the child’s act in repeatedly hammering its spoon against a dish.

*Hammering with Nut* (or any small, hard, preferably round object).—The *cebus*, Harry, will take a hickory nut to some hard surface and hammer with it at intervals for several moments. Short series of taps, averaging four to six separate taps to each series, take place in quick succession—150 such series were once counted in one half hour. Another *cebus*, Sammy, exhibited the same reaction. In the forest, this act is probably connected with some kind of food-getting process. It has no significance in the present environment of the animals, but seems to have been retained for its value as a circular form of play. A spoon, piece of metal, small rock, etc., will often be taken to the window-pane by Sammy and used as a hammer in this way.

The *rhesus*, Jimmy, also gives evidence of such a type of reaction: Occasionally (but rarely) he will sit and play with a hard object and

let it slip idly through his fingers to the board upon which he sits, pick it up again, and again drop it. Putting a handkerchief or towel over his face, then removing it, and repeating the process over and over again is another form of Jimmie's play.

I have found it possible to instigate Jimmie to perform one rather interesting instinctive act: Flea-catching, regardless of what the sociologist may have to say, is the most fundamental and basal form of social intercourse between rhesus monkeys! The act is well known. As the monkey works over the body of his companion with his paws, he smacks his lips together continually and occasionally brings one paw to the mouth. This smacking sound is the invariable accompaniment of the act. It can be imitated easily and perfectly. I was able to get Jimmie, on one occasion, to come to me and to let me 'pick' him. After I had performed the act satisfactorily to him, he perched upon my shoulder but made no attempt to 'pick' me. I held up the hairy part of my arm to him, but he still made no effort in that direction. I then began to make the smacking sound with my lips. He immediately made the sound in turn and began searching my arm and then proceeded to my neck (I was wearing a rubber cap over my hair). On two or three other occasions, I was able to repeat this, but I cannot produce the act at will.

The examples cited, taken in connection with the behavior of Jimmie and Billy described in the early part of this paper, will serve to show that we have in the reactions of the monkeys, at least a rudimentary type of imitation.

The anecdotal material which I have collected would compare favorably with that presented by Romanes and others, but close examination of such acts, especially during the period of their genesis, does not lead me to think that the higher forms of imitation are present in them.<sup>1</sup>

<sup>1</sup> Dr. Karl T. Waugh has undertaken to repeat the experiments of Berry (see review section) upon these monkeys. The writer wishes it understood that his present conviction upon the subject of imitation stands ready to be changed as soon as the evidence calls for it.

## PSYCHOLOGICAL LITERATURE.

### PROGRESS IN THE STUDY OF THE BEHAVIOR OF THE LOWER ORGANISMS DURING THE PAST YEAR.

The most important advances in this field have been (1) in the study of the formation of habits, associations and other modifications of behavior, and (2) in researches on reactions to light. We shall take up the more important works under these two heads, then deal with some miscellaneous matters.

#### I. FORMATION OF HABITS, AND OTHER MODIFICATIONS OF BEHAVIOR.

(a) *Protozoa*. — The behavior of the Protozoa continues to become more and more complex with the advance of precise knowledge. Metalnikow<sup>1</sup> describes experiments which seem to show that the infusorian *Paramecium* sorts over and selects its food, and that this selection becomes modified by the experience of the organism. The prevailing belief that the infusoria make no selection in food is based largely on the fact that inert substances, such as carmine or India ink, are taken as readily as useful food particles. But according to Metalnikow, if the animals are left for several days in water containing such inert particles, they cease to take them, though *they continue to take other particles of food* that are mixed with these inert particles. This would require a definite power of sorting over the food particles, rejecting some and admitting others, together with capacity for the educability of these powers—properties claimed for infusoria by Hodge and Aikins as long ago as 1895, but not commonly admitted.

It should perhaps be said that certain attempts to confirm the results of Metalnikow, under the direction of the present reviewer, have not as yet been successful. But unquestionably a thorough study of the food reactions of the infusoria would give results of more importance for judging the real nature of their behavior than perhaps any other line of work.

Stevenson Smith, in a paper read before the International Congress

<sup>1</sup> Metalnikow, S., 'Ueber die Ernährung der Infusorien und deren Fähigkeit ihre Nahrung zu wählen,' *Travaux de la Soc. Imp. d. Naturalistes de St. Petersburg*, 1907, 38, 181-187.

of Zoölogy in Boston, described experiments which seemed to show clearly that *Paramecium* modifies its behavior with experience. The animal was placed in a capillary tube so narrow that it could turn around within the tube only by doubling on itself. Coming to an obstacle (the surface film at the end of the water column), it endeavored to avoid this in the usual ‘trial and error’ way—backing, and turning repeatedly in different directions. Finally it doubled over its body, and returned on its course, thus escaping. On repetition of this experience it gradually lost its tendency to react on the ‘trial and error’ plan; on reaching the film it at once doubled and turned directly, retracing its course. The work of Smith seems accurate and clear. A full account is to appear in the *Journal of Comparative Neurology and Psychology*.

(b) *The Lower Invertebrates.*—Perhaps the most important and interesting series of investigations in recent times on behavior of lower organisms is that of Georges Bohn and associates, dealing with the part played by the past history of the organism in determining its present reactions. These investigations deal mainly with the life of the animals of the seashore. The separate observations by Bohn, Piéron and others have been recorded as they were made, in numberless brief notes mainly in the *Comptes rendus de la Société de Biologie*. From time to time the results have been brought together in more unified form in publications of the Institut Général Psychologique. A recent contribution by Bohn<sup>1</sup> gives a useful and interesting general account of this work, with particular reference to the sea anemones and their relatives. I shall try to bring out some of the main facts.

At the seashore we find such a complex of continually changing conditions as to constitute, as Bohn remarks, ‘a vast field of experimentation.’ For example, all the numerous animals of the seashore require certain amounts of moisture; some more, some less; some live in the dry sand, others beneath the water, and there is every gradation between these extremes. Now, there are repeated changes in the amount of moisture of any given region of the shore, owing mainly to the periodic alternation of the tides, secondarily to the alternations of day and night, and in minor degree to other causes. The animals are forced to adapt themselves in some way to these changes, and this results in producing periodic changes in their activity. For a certain time the snails of the rocks, being moist, come out of the crevices,

<sup>1</sup> Bohn, G., ‘Introduction à la psychologie des Animaux à symétrie rayonnée,’ *Bul. Institut Général Psychologique*, Nos. 1-2, 3-4, 7<sup>e</sup> année, 1907 87 pp.

creep about and carry on their other life activities; then for a period, being dried, they retreat into crevices, close their shells, and remain inactive. The mudworms remain at the surface for a time, then creep into their holes. The sea anemones extend for a time; then as the tide falls, they collapse, and so remain till the tide again rises. We have then a grand experiment in progress, on the effects of periodic changes in external conditions on the behavior of animals.

The effects of these periodic changes are found not to pass away at once; they leave certain effects on the animal which show themselves in the future behavior, even when the organisms are removed to uniform conditions, as in the aquarium. We find here illustrated on a grand scale and in a most striking way the fact that the reactions of even lower organisms are not definite, fixed, final; but that they depend on the past history of the individual. At the seashore, says Bohn, "one can thus study with ease the way in which the diverse factors of the environment fashion, as it were, the living material."

The effects of past history on present reactions are shown in numberless ways; we can list but a few typical cases from among the many described by Bohn.

Many specimens of the sea anemone, *Actinia equina*, live attached to stones in tide pools. When the tide is low they become partly uncovered; the water stagnates; there is too little oxygen, and the animals close tightly. Now, the first sign of this condition is a cessation of wave motion as the tide goes down. As soon as the waves cease, the *Actinias* at once collapse; they do not wait till the amount of oxygen has really decreased. When the waves begin again, the animals at once expand. It is possible to induce them to expand by making artificial waves, or to contract by preventing the waves from reaching them. But this reaction is variable, *depending on the tide period*. If the animals are placed in an aquarium where the water level does not change, at the period for high tide any slight shock causes them to expand and remain expanded for some time. But during the period for low tide such a slight shock has no effect; the animals are accustomed to remain contracted during this time, so that they can with difficulty be induced to open; if they do open at all, they quickly close again. At the time of low tide any of the various stimuli that tend to cause contraction, act with redoubled effect, while stimuli causing expansion act with redoubled effect at the time of high tide. Sometimes the effect of a slight shock is quite reversed in the two periods; at high tide it causes expansion; at low tide, contraction. The periodicity goes in some cases so far that the animals in the aquarium

spontaneously contract and remain contracted during the period of low tide, while at high tide they extend and remain open. *Actinias* that had lived in deep water, not subjected to tidal action, do not show this periodicity; it is an effect of the past history of the individual.

In many other ways the behavior of the sea anemone depends on its past history. Specimens which have lived in a well-lighted region contract less readily in response to light, and expand more readily in response to other stimuli, than do those from shaded regions. There is a tendency to establish a periodicity corresponding to day and night similar to that due to the tides. Different specimens (of the same species) show, under uniform conditions, different periodicities, depending on their earlier history and habitats. "The *Actinias* which live on the vertical walls of rocks at high levels and which thus undergo drying at low tide have the rhythm of the tides; those which live in pools of water at the same level, constantly under the water, present the rhythm of day and night, and this also persists in the aquarium. Often masked by present causes, it becomes very evident in a medium of such remarkable constancy as that of a dark chamber" (Bohn, *I. c.*, p. 31). Many experimental demonstrations of these periodicities are described by Bohn; the combination of the two natural rhythms, together with modifications due to laboratory treatment, often produces results of much complexity and apparent capriciousness — though strictly determined by the past history.

A peculiarly interesting effect of past conditions was shown by Bohn's associate, Van der Ghinst.<sup>1</sup> Some of the individuals of *Actinia* live (1) on the under side of rocks, with the disk directed downward; others (2) on the upper surface of rocks, with the disk directed upward. When placed in an aquarium between an upper and a lower plate of glass, each set takes the position it had in nature; the first set on the upper glass, with disk downward, the second set on the lower glass, with disk upward. If forced to take unaccustomed positions, they lose after 24 to 48 hours the tendency due to the original habitat.

Other animals of the seashore show similar phenomena. The snails of the genus *Litorina* react negatively to light at the time of high tide, when the waves rise and strike the rocks on which they are found; they thus creep into holes and are protected. When the waves fall and their shocks cease, *Litorina* becomes positive to light, comes out of its holes and creeps about. Bohn shows that even after the animals are brought into the laboratory, at the time of high tide slight

<sup>1</sup>Van der Ghinst, I., 'Quelques observations sur les Actinies,' *Bul. Inst. Gén. Psychol.*, 6, 268-275.

shocks cause them to become negative and withdraw; while at the time of low tide they remain positive in spite of shocks. If we place *Litorinas* between two screens, one light, the other dark, those individuals that have been living at high levels and have therefore often been dried in the light, go toward the dark screen; those that have lived at low levels and so have not been dried in the light, go toward the light screen. The annelids *Hedista* are negative to light at high tide (going into holes), positive at low tide (coming out of holes). If in the aquarium they are placed between two screens, one black, the other white, they tend for about the six hours of high tide to go toward the black screen; for the six hours of low tide, toward the white screen.

The facts brought forth by Bohn, showing the effects of past history on reactions to present conditions, are impressive from their great number and the minute details in which the influence shows itself; a full account of them should if possible be made accessible in English, as they throw a most important light on the nature of behavior. Bohn expresses, evidently with much ground, the following general conclusion: "These phenomena of association appear to me excessively important; since the work of the Americans this seems to lie at the basis of the psychology of higher animals; I believe that it ought to form equally the basis of the psychology of the lower animals; thus one is obliged to make these phenomena intervene constantly in order to explain the reactions of *Actinias* or *Litorinas*" (*l. c.*, p. 77).

Bearing on these same aspects of behavior are the papers of Glaser on the brittle star, and of Jennings on the starfish. Glaser<sup>1</sup> studied in the brittle star the 'righting' reaction and the removal of a rubber tube slipped over the base of an arm, with reference to possible improvement with experience. He found, as Preyer had done, that the animals solve these 'problems' in many different ways. But if presented the same 'problem' many times in succession, the animals did not improve, by reducing either the time taken or the number of useless movements. Glaser concludes that there is no indication of 'intelligent' action. He believes that the lack of modifiability is due to the 'versatility' of the animals; since they can solve the problem in any one of many ways, there is no strong reason why one should prevail over the others.

Jennings<sup>2</sup> reached with the starfish the same negative results when the animal was left to itself. But the experimentation was carried a

<sup>1</sup>Glaser, O. C., 'Movement and Problem Solving in *Ophiura brevispina*', *Journ. Exp. Zoöl.*, 4, 1907, 203-220.

<sup>2</sup>Jennings, H. S., 'Behavior of the Starfish *Asterias forreri de Loriol*', *Univ. of California Publications in Zoölogy*, 4 (no. 2), 1907, pp. 53-185.

step farther; in studying the righting reaction the experimenter actively intervened in such a manner as to prevent the starfish from succeeding in any way save one. When thus 'trained' the animal formed definite habits with some readiness. When the animal is left to itself, such habits gradually disintegrate under the action of other influences tending to cause variations in behavior; some were observed to last as long as a week.

The work of Jennings is an extensive general study of the behavior of the starfish, including a detailed study of the action of the pedicellariae in protection and in capturing food; the food reactions in general; positive and negative reactions to the common environmental conditions, and a particularly thorough study, illustrated by numerous photographs, of the righting reaction. "Perhaps the most important thing developed in the paper is the demonstration of the variability, modifiability, unity and adaptiveness of the main features of the behavior of the starfish. The movements are shown to depend on the varying physiological conditions of the animal, and the numerous factors which demonstrably modify the physiological condition, and therefore the behavior, are set forth in detail. Habit formation is demonstrated and discussed in full. The unity and coördination of much of the behavior is presented and some theories of its nature and origin discussed. Of subordinate importance are the essentially new, correct accounts of the method of locomotion and of the way in which the negative reactions occur" (p. 183).

## 2. REACTIONS TO LIGHT.

One of the most important papers that has ever appeared in this field is that of Cole.<sup>1</sup> Leaving the traditional groove, the author presents problems and results that are new. He studied in a number of lower organisms the image-forming power of the eyes—what might be considered the beginning of the power to see objects. The animal was placed midway between two sources of light, of such strength and distance that (measured) light of equal intensity reached it from both sides. But one source of light was very small, while the other was large—so that the two would produce different images, in image-forming eyes. It was now found that some lower organisms react with reference to both lights equally, while others react mainly with reference to the light from the source of larger area. In the former group the reaction apparently depends only on the intensity of the

<sup>1</sup> Cole, L. J., 'An Experimental Study of the Image-forming Powers of Various Types of Eyes,' *Proc. Amer. Acad. of Arts and Sci.*, 42, 1907, 335-417.

light reaching the organism; to this belong the earthworm, the larva of the meal worm, and apparently certain others. In the latter group, where there is evidently the beginning of the power of forming images, of 'seeing objects,' were found the butterfly (*Vanessa*), the water scorpion (*Ranatra*), the cricket frog (*Acris*), the green frog (*Rana*). A number of others showed slight indications of the power to form images; among these are the flatworm (*Bipalium*) and the sowbug (*Oniscus*). Cole's work seems to answer definitely the old question why the positively phototropic moth does not fly toward the sun or moon; it is because areas of light on the earth are much larger, though not so intense.

This work of Cole's seems fundamental in character; it will probably serve as a point of departure for much future work, that shall give us a real understanding of the complex and varied ways in which lower organisms respond to the stimulus of light from objects. This work will have to take into consideration size, form, pattern, motion, color, and associative processes as possible determining factors.

Minkiewicz,<sup>1</sup> like Cole, has given us an important study in reactions to light that is quite out of the common groove; he justly introduces his paper with the statements that "In the question with which I deal I have no precursors." "All that will be found in what follows — the facts, the method of analysis, the way of looking at the facts in their ensemble — all is new."

Certain crabs are accustomed to disguise themselves by attaching small foreign objects over the surface of the body. The author studied this behavior in relation to colors. The crabs were placed in aquaria having, in different cases, linings of different colors, and were then supplied with an assortment of bits of paper of varied colors. The crabs thereupon selected out the pieces that corresponded to the background on which they were situated, and fastened these over the surface of the body! In a white aquarium they disguised themselves with white paper, in a green aquarium with green, in a red one with red, etc. Only in a black aquarium did this correspondence fail.

After the crabs have disguised themselves, they are placed in another aquarium, the two halves of which are lined with different colors. The crabs thereupon betake themselves to that half of the aquarium which corresponds in color to their disguise; those clothed in green go to the green half, those in red to the red half, etc. Experiments show

<sup>1</sup> Minkiewicz, R., 'Analyse expérimentale de l'instinct de déguisement chez les Brachyures oxyrhynques,' *Arch. de Zool. Expér. et Gén.*, 1907 (4), 7, notes et revue, pp. xxxvii-lxvii.

that this is due, not directly to the color of the coat worn by the crab, but to the fact that the crabs betake themselves to a region colored the same as that in which they have been before.

The author thus shows that the crabs react differently to different colors; they are negative to one color, while positive to another. To this demonstration of the effects of *color*, as contrasted merely with the effects of light, the author justly attaches great importance; he holds it to negative many of the current wide generalizations as to the uniform action of all the rays, the exclusive importance of direction of rays, of intensity, or the like.

In an attempt to express and explain the facts in a purely objective way, the author proposes numerous new technical terms, and gives an extensive general discussion of different ways of looking at such phenomena. However looked at, the unexpected demonstration of the extensive powers of 'color vision' possessed by a lower animal, and of the highly adaptive behavior in which this results, is of the greatest interest.

Walter<sup>1</sup> has made a detailed study of all the reactions to light in the flatworm — an organism showing none of the 'image-forming' power described by Cole. The experimental work is of the most thorough and satisfactory character; undue schematizing is avoided, and all sorts of factors are taken into account: the intensity and direction of the rays; effect of changes in intensity of the light, the complicating effect of other stimuli, effects of fatigue, varying physiological states, effects of habit, individual differences, etc.; further all the different methods of reaction are taken up in detail. Thus the work is one of the best for obtaining an idea of the complexity of the phenomena in the reactions of even a simple organism to a single kind of stimulation. But of course the conclusions to be drawn are much less sharp and superficially satisfactory than those that can be drawn from superficial work; for such facts as the following have to be considered: "Negative planarians frequently take an apparently positive course, because the impulse to move in any direction is greater than the phototactic impulse. The normal negative phototaxis of a worm may change temporarily to positive by reason of some physiological state which is not obviously referable to external stimuli" (p. 86). "Whatever the part played by light in their behavior it must always be an exceedingly varied and complex one." This of course makes the paper difficult to abstract satisfactorily.

<sup>1</sup> Walter, H. E., 'The Reactions of Planarians to Light,' *Journ. Exper. Zool.*, 1907, 5, 35-162.

As to the nature of the stimulus, the following conclusion is drawn : "The behavior of planarians may in general be more satisfactorily explained, by regarding, with Loeb, the intensity rather than the direction of light as the principal operative factor in light reactions" (p. 140).

Certain points in the author's general discussion, ostensibly directed against the present reviewer's views, call perhaps for a word.Replying to criticism of the tropism theory, he says: "The tropism theory, on the contrary, is based upon asymmetrical action as the result of asymmetrical stimulation." "It seems to me that the mechanism by means of which the asymmetrical response is brought about is immaterial, so long as the response can be shown to be the result of asymmetrical stimulation." Taking this as the criterion of the tropism, I am of course an ardent disciple of the view that most directive reactions (including those of man) are tropisms. No one, so far as I am aware, has been so mad as to deny that animals commonly respond unsymmetrally to unsymmetrical stimuli. Thus, in my *Behavior of the Lower Organisms* (1906), the following occurs: "In still other cases the reaction shows definite relation to the localization of the stimulus, yet it is not due to local reaction of the part stimulated, nor is it brought about by trial. . . . The flatworm turns toward or away from the side stimulated, by reactions involving the muscles of both sides. . . . Innumerable instances of this class of reactions could be given; they include perhaps the greater number of the directed movements of organisms" (p. 307). Walter has added nothing to the analysis of the unsymmetrical reaction of the flatworm, made by Pearl, and quoted *in extenso* in my book, and his results and views are in full accord, so far as I can see, with my interpretation of the matter (*l. c.*, p. 273). The only ground for discussion is the propriety of my use of the expression 'tropism theory.' My criticism was directed against a certain view of the mechanism of such reactions—a view which made this mechanism extremely simple. For calling this 'tropism theory' I am perhaps open to criticism, but it is important not to mistake a difference in usage of words for a difference of opinion as to the facts. To hold that "the tropic form of response may, and probably does, require a more complex mechanism than that which causes the motor reflex," that "it does not necessarily depend upon the direct stimulation of the motor organs, nor is it essentially stereotyped in character any more than are trial and error responses by motor reflex or random movements" (Walter, p. 153), is to hold the same views which I have urged, but to give them the name tropism

theory (a procedure which of course I have no desire to criticize). The above quotations, had they come from my own pen, would have differed only by beginning ‘responses that have often been considered tropisms,’ instead of ‘the tropic form of response’; that is, I criticized the tropism theory as a certain narrow conception of the way reactions occur. Tropism is as good a name as any for ‘asymmetrical reactions to asymmetrical stimuli’ if we can agree that this is all we mean by it. Unfortunately, in my large collection of definitions of tropism, gathered from all sources, this one has not hitherto occurred. My endeavor to ward off a narrow conception of reactions in the lower organisms as simple and uniform has apparently been so successful as to leave nothing but the use of words to strive over. Essentially the view which I have tried to emphasize is neatly compressed by Walter into ‘tabloid form’ in the sentence “strictly speaking, all behavior is individual behavior” (p. 97).

Esterly<sup>1</sup> gives us a study of some of the peculiar interrelations of stimuli, in the effects of light and gravity on the daily migrations of certain crustaceans. In the light these animals are positively geotropic; during the day, therefore, they descend into the depths. In the dark they are negatively geotropic, coming to the surface at night. They are at all times negative to light, but the reaction to gravity overcomes the reaction to light.

Hadley<sup>2</sup> has studied the reaction to light in young lobsters, in various larval stages. An interesting point is the change in the character of the reactions with increased age. In the youngest stages the animals orient with anterior end *away* from the light, then swim backward *toward* the source of light; they gather in lighted regions. In older larvae the orientation is less precise, and they gather in darkened regions. The effect of blinding one eye, in the younger stages, is to cause perfectly definite changes in the movements. The swimming appendages on the blinded side beat less strongly, those on the other side more strongly. As a result the animal turns or rotates over toward the blinded side. In consequence of this it may now, under certain conditions, in becoming oriented with anterior end away from the light, turn first directly toward the light; it then continues turning for more than 180 degrees, till its uninjured eye is directed away from the light. The results are due, the author holds, to a specially in-

<sup>1</sup> Esterly, C. O., ‘The Reactions of *Cyclops* to Light and to Gravity,’ *Amer. Journ. Physiol.*, 1907, 18, 47-57.

<sup>2</sup> Hadley, P. B., ‘The Reaction of Blinded Lobsters to Light,’ *Amer. Journ. Physiol.*, 1908, 21, 180-199.

timate connection between the eye and the swimming appendages of the same side. Whether the imperfection of the reaction can be corrected by experience, as Holmes showed to be the case in *Ranatra*, the author did not determine.

In view of the definitely determined character of the responses, the author contrasts them with the 'method of trial and error.' Without wishing to discuss this view for the case in hand, it needs to be emphasized that if the decision whether a reaction is by 'trial and error' depends on whether the movement is definitely determined or not, then the question is an idle one, and there is no such thing as 'trial and error.' There is no scientific ground for holding that undetermined movements exist in any organism whatsoever. The present reviewer used this designation for certain features of the behavior of lower organisms, because he found that they agree with certain behavior of higher animals that had received that name, in the fact that certain parts of the reaction do not tend to produce the result finally reached, and that the stimulation in consequence continues or is increased, so that the reaction is continued till it does produce that result. How the different features of the reaction are determined is a question to be worked out for each case. It appears worth while to distinguish this style of behavior from that in which all the movements tend to produce the result finally reached; and it will be well if someone can devise for it an appropriate name that cannot be misunderstood by those whose way of thought is incorrigibly anthropomorphic. The 'method' is really an example of that *greater permanence of certain of the combinations produced by varied activities*, which is so common everywhere, and which has often received the anthropomorphic name of *selection*.

### 3. MISCELLANEOUS.

Holmes<sup>1</sup> studied the behavior of a large infusorian, *Loxophyllum*. While its reactions fit the general schema of infusorian activities, Holmes found its behavior considerably more varied than that of *Paramecium*; in this respect it evidently comes nearer to *Stentor*. The behavior of pieces was studied; the author finds that they react in essentially the same way as does the entire animal. Holmes is convinced that the behavior is a factor in regeneration.

Bancroft<sup>2</sup> demonstrated by adding India ink to the water that in

<sup>1</sup> Holmes, S. J., 'The Behavior of *Loxophyllum* and its Relation to Regeneration,' *Journ. Exp. Zoöl.*, 1907, 4, 399-418.

<sup>2</sup> Bancroft, F. W., 'The Mechanism of the Galvanic Orientation in *Volvox*,' *Journ. Exp. Zoöl.*, 1907, 4, 157-163.

*Volvox* the electric current causes a cessation or diminution of the stroke of the cilia at one pole of the organism; the creature therefore turns directly into orientation, as do most infusoria. Although the same method showed no such effect on the beat of the cilia in the case of the reaction to light, Bancroft is nevertheless inclined to assume that orientation to light is brought about in the same way.

Harper<sup>1</sup> contributes an interesting though somewhat abstractly written account of the reactions of the larva of a mosquito.

V. Uexküll<sup>2</sup> contributes an interesting account of the method and mechanism of locomotion and burrowing in one of the heart-shaped sea urchins, with particular reference to the nature of muscle and the part played by it and by the nervous system.

Piéron<sup>3</sup> attempts to show, both for protective quiet, or what is commonly called 'death feigning,' and for autotomy, or the cutting off by a crab, insect, etc., of one of its own limbs, that the action is not always purely reflex, but is at times rather of the same order as the so-called 'voluntary' or 'psychic' behavior. Drzewina<sup>4</sup> tries to show that Piéron's grounds for distinguishing a 'voluntary' autotomy are not well founded. Holmes<sup>5</sup> gives a general and somewhat popular account of the facts of 'death feigning.'

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## RECENT RESEARCHES ON THE BEHAVIOR OF THE HIGHER INVERTEBRATES.

### I. AUDITION.

Do the hymenoptera hear, has long been a debated question. Buttel-Reepen<sup>1</sup> insists that bees hear, because they respond, in a definite manner, to sounds made by their own kind. It has long been

<sup>1</sup> Harper, E. H., 'The Behavior of the Phantom Larva of *Corethra plumicornis* Fabricius,' *Journ. Comp. Neurol. and Psychol.*, 1907, 18, 435-455.

<sup>2</sup> Uexküll, J. v., 'Studien über den Tonus,' IV., *Die Herzigel, Zeitschr. f. Biol.*, 49, 307-332.

<sup>3</sup> Piéron, H., 'Contribution à l'étude de l'immobilité protectrice,' *C. R. Soc. de Biol.*, 1908, 64, 184-186; 211-213. *Id.*, 'Recherche sur l'autotomie: De l'existence d'une autotomie psychique superposée à l'autotomie réflexe,' *Arch. Internat. de Physiol.*, 1907, 5, 110-121.

<sup>4</sup> Drzewina, Anna, 'Sur la prétendue autotomie psychique,' *C. R. Soc. de Biol.*, 1907, 63, 459-461.

<sup>5</sup> Holmes, S. J., 'The Instinct of Feigning Death,' *Pop. Sci. Monthly*, 1908, 72, 179-185.

<sup>1</sup> Buttel-Reepen, *Are Bees Reflex Machines?* Medina, Ohio, 1907. (This is a translation by Mary Geisler of a paper which appeared in 1900.)

known that ants possess special organs for producing sound, and Wheeler has maintained that ants communicate by means of sounds; yet, since the researches of Huber, Forel and Lubbock yielded negative results, ants were considered deaf. Weld performed certain experiments which indicated that certain ants hear; but Fielde and Parker's insistence that ants do not respond to aerial vibrations discredited his results. Researches<sup>2</sup> published during the past year demonstrate that ants hear. When outside the nest they pay little or no attention to sounds; but when inside they respond to them with very active movements. This is true even when precaution is taken to prevent the sound waves reaching them through any medium other than the air.

## II. VISION.

A critical experimental study of the color vision of the higher invertebrates is much needed. What has been accomplished, during the past year, for ants confirms former statements that they pay little or no attention to the color of the pathway,<sup>2</sup> and shows that their reaction to colored lights is a true visual response.<sup>3</sup> Buttel-Reepen<sup>1</sup> states that bees possess color vision and bases his belief on the following observations:

1. Some bees, on a dark day, mistook a gable that had been painted sky-blue for the open air and tried to fly through it.
2. "A weak after-swarm, mostly of young bees from a hive painted blue, dispersed among the masses of humming bees which were just taking their flight of orientation out of the other hives (which, as is usually the case in Germany, Switzerland and Austria, were standing close together), and settled here and there in clumps. After a short time they flew back to the bee-house, but only a few found the right hive; the rest flew to other colonies, and to which? Only where a blue color invited them did they attempt an entrance and nowhere else." This shows a discriminating vision, but not necessarily the ability to distinguish hues; for in each of these cases the blue may have appeared to the bees as a grey.

## III. DISTANT ORIENTATION.

Another disputed point upon which recent studies have thrown some light is, How do ants and bees find their way home? Bethe insisted

<sup>2</sup> Turner, C. H., 'The Homing of Ants,' *Jour. of Comp. Neur. and Psy.*, Vol. XVII, 1907, pp. 367-435, pl. II.-IV.

<sup>3</sup> Pricer, Jno. L., 'Life History of the Carpenter Ant,' *Biol. Bull.*, Vol. XIV., 1908, pp. 177-218.

that bees are guided home by an unknown force which acts reflexly and that ants are similarly guided by a doubly-polarized odor trail. As far as bees are concerned, Buttel-Reepen<sup>1</sup> has shown the weakness of Bethe's experiments and reports that bees on leaving the hive for the first time make a careful examination of the surroundings. Bees that are not permitted to do this cannot find their way home; neither can bees find the way home after dark. All this militates against Bethe's contention. As for ants, the work of both Pricer<sup>3</sup> and the reviewer<sup>2</sup> prove that ants do not slavishly follow the odor trail. By means of a large number of experiments upon several species of ants, it has been demonstrated<sup>2</sup> that ants find their way home neither by a homing instinct nor by an odor reflex, but by *learning* by experience and by utilizing certain reference data, one of which is the direction of the rays of light. What they once learn is remembered for some time. Pricer's<sup>3</sup> work on ants and Buttel-Reepen's<sup>1</sup> on bees give additional evidence that the hymenoptera possess memory.

It has been shown<sup>2</sup> in the following manner that ants have memory of position or knowledge of location. An ant was trained to mount a section lifter and be carried to and from a table top to an elevated stage from which the ant carried pupæ to the nest. In training the ant, the section lifter was always presented at the same place. After the ant had become accustomed to using the section lifter as an elevator, it would always go to the same place on the table and wait for the presentation of the section lifter. Pricer<sup>3</sup> also claims that ants have memory of location.

#### IV. OBSERVATION ON THE 'TIME SENSE.'

That bees possess not merely a knowledge of space, but also a knowledge of time, has been suggested by Buttel-Reepen's<sup>1</sup> observation that, when the buckwheat is in bloom, bees, which normally fly at all hours of daylight, fly only during those hours that the buckwheat gives up its nectar; and proven by the following experiment of Forel's:<sup>4</sup> A table was set in the open, upon which breakfast was served between 7:30 A. M. and 10 A. M., dinner at noon and lunch between 4 P. M. and 5 P. M. Jam, of which bees are quite fond, was served for breakfast and lunch, but not at noon. The bees visited the table in great numbers; but after the first few days they came only between the hours of 7 and 8 A. M. and between 4 and 5 P. M. After things had continued thus for some time, the table was set as

<sup>1</sup> Forel, A., 'Mémoire du Temps et Association des Souvenirs chez les Abeilles,' *Comptes rendus d'Association Française pour l'Avancement des Sciences*, 1906, pp. 459-464.

usual, but no jam was placed thereon. Between 7 and 8 A. M. the bees came in great numbers and searched diligently everything thereon, especially those vessels that had formerly contained jam. This search was continued until nearly 10 o'clock. At noon only one bee came, at 4 o'clock many came, but did not tarry long. The next day the same conditions were repeated. A few visited the table, but they did not tarry long.

#### V. METHODS OF COMMUNICATION.

Can bees and ants communicate? For bees Buttel-Reepen<sup>1</sup> says, yes, they communicate by means of sounds. He bases his assertion upon his observations that bees respond to sounds made by other bees and that they always respond to similar sounds in the same way. For ants this has long been an open question. Pricer<sup>2</sup> says they do; but since his assertion is based upon an experiment which does not preclude the possibility of the reaction being merely a response to a strange odor, the problem is still unsolved.

#### VI. EVIDENCE FOR FORMATION OF 'PRACTICAL JUDGMENTS.'

Not only do the hymenoptera have sensations and memory; but, under certain conditions ants seem to form what Hobhouse calls practical judgments. The experiments<sup>3</sup> upon which this conclusion is based may be epitomized as follows: (1) An ant of a colony of *Formica fusca* var. *subsericea* was noticed to construct a partial bridge of three sections upon the ditch that surrounded the Lubbock island upon which it was housed. (2) A colony of *Camponotus herculeano-ligniperdus* had been residing for weeks in a Janet nest, the outer opening of which was quite large. An ant almost always mounted guard in that entrance. After this guard had been repeatedly irritated with dissecting needles, it withdrew from the entrance, which the ants plugged with detritus. (3) A colony of *Formica fusca* var. *subsericea*, which had lived for many generations where it would be impossible for a crack to appear in the top of its brood chamber, was captured and housed in a Janet nest. A crack was made in the top of the brood chamber. A few ants soon covered this with coarse trash. The trash was removed by the experimenter only to be replaced by the ants. After this had been repeated several times the ants, instead of piling coarse trash on top of the crack, closed it from within by building up from the floor a felted wall of fine particles. Control experiments were made.

<sup>1</sup>Turner, C. H., 'Do Ants Form Practical Judgments?' *Biol. Bull.*, Vol. XIII., 1907, pp. 333-343.

Here we have a utilization of instinctive activities, without a period of preliminary experimentation, to meet adequately conditions for which the ants had no stereotyped response. Such behavior on the part of an animal Hobhouse says gives evidence of the ability to form practical judgments.

### VII. SOCIAL CHARACTER OF CERTAIN RESPONSES.

A recent French article<sup>6</sup> lays stress upon the idea that a bee colony is a community in which the individual intelligence has been subordinated to the group intelligence. He thinks that among them we have intelligent coöperation and what he calls collective reasoning (*raisonnement collectif*). His conclusion is based upon experiments like the following: If we tie pieces of comb in the frames of a hive with a string, the bees will cement the pieces together, construct cells in the gaps and then remove the string. In removing the string, certain bees cut it into pieces. Other bees, coöperating, carry the pieces out of the hive, several assisting with each piece. He placed a large lump of sugar in a certain place. Bees discovered it, but could neither carry it away bodily nor bite off small pieces. They returned to the hive and were joined by others. They then obtained water and dropped it on the sugar to form syrup. The syrup was carried to the hive. This experiment was repeated with similar results. Both of these experiments, and others in his article, are most interesting; but, to explain them, we certainly do not have to predicate anything higher than what Hobhouse calls a practical judgment; and if, as I understand him to say, the bees always act this way under similar circumstances, then the above responses are nothing more than remarkable instincts.

In a work<sup>7</sup> abounding in observations and experiments Wheeler publishes the following conclusions which will be of interest to students of animal behavior: (1) In the lives of social insects, the philoprogenitive instincts are of such transcendent importance that all other instincts become merely tributary or ancillary thereto. (2) The social life itself is merely an extension of these instincts to the adult offspring. (3) The philoprogenitive instincts arose and were highly developed among the solitary ancestral insects long before social life made its appearance. (4) The phylogenetic differentiation of caste arose in the sphere of function before it manifested itself in structural peculiarities.

<sup>6</sup> Bonnier, Gaston, 'Le Socialisme chez les Abeilles,' *Bull. de l'Inst. Général Psychologique*, 7 Ann., pp. 397-426.

<sup>7</sup> Wheeler, W. M., 'The Polymorphism of Ants with an Account of Some Singular Abnormalities Due to Parasitism,' *Bull. Amer. Mus. Nat. Hist.*, XXIII. (1907), pp. 1-93, pl. I.-VI.

(5) The foraging instinct may be due to chronic hunger. (6) Regulation takes place in the sphere of instinct as well as in the sphere of morphology. (7) The social instincts cannot be used to support any of the mechanical theories of development.

Bethe's contention that ants and bees are merely reflex machines, to which we must not even ascribe sensations, is no longer tenable; for the researches of the past year have demonstrated that the behavior of the higher invertebrates is not a series of tropisms, but the result of a psychic complex ranging from simple sensations up through memory. Although we have no evidence of reasoning in its highest phases, yet here and there we catch glimpses of what Hobhouse calls a practical judgment.

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## RECENT LITERATURE ON MAMMALIAN BEHAVIOR.

### I. THE ESTABLISHMENT OF HABITS.

In an important contribution to the behavior of raccoons, Cole<sup>1</sup> describes in detail their methods of learning to release the fastenings of various problem boxes. The boxes were similar in nature and complexity to those used by Thorndike, Kinnaman and others in their tests upon monkeys.

The time records of the four raccoons for the learning of these fastenings show greater variability than those of cats and monkeys. In the rapidity of forming associations, the raccoon stands almost midway between the monkey and the cat. In regard to the complexity of association, Cole states that the raccoon deserves a place closer to the monkey than to the cat. Davis<sup>2</sup> in a similar study on a much larger number of raccoons (12) reaches a conclusion similar to the above. On page 475 of his article he plots a curve (6), the data for which was obtained from Kinnaman's study of the monkey. The curve represents a series of thirty trials each on nine simple locking devices. Davis compares this with a similar curve obtained from the raccoons on the same (or closely similar) devices. The general character of the learning curves for both animals is the same. According to Davis, the monkeys are a little less clever at the start than the raccoons. Also the curve for the monkeys is slightly more irregular than

<sup>1</sup> Cole, L. W., 'Concerning the Intelligence of Raccoons,' *Jr. Comp. Neurol. and Psy.*, Vol. XVII., No. 3, May, 1907.

<sup>2</sup> Davis, H. B., 'The Raccoon; A Study in Animal Intelligence,' *Am. Jr. Psychology*, Vol. XVIII., No. 4, 1907.

that of the raccoon; this would point to the conclusion that the monkey is slightly more open to distraction than the raccoon. Cole and Davis are thus seen to be somewhat at issue on the question of variability.

Davis brings out the added points that the young animals are more reckless in their expenditure of energy than the old, consequently they solve the various problems at first more rapidly than the adults; and that all through their work the young animals show a greater variability than the adults.

An interesting contested point has been raised between Davis and Cole: Cole found that when he changed the position of fastenings the trained animals never began work at the parts of the box where the fastening had previously been placed, but went at once to the new position of the fastening. Davis' results are opposite: He found that several of his animals did persistently work at the place where a mechanism customarily had been located before finally discovering it in its new position. The question is raised here because the reviewer has found, as has every other investigator up to the present time, that the 'position' error is the most fundamental and deeply rooted error which occurs in mammalian reactions. If Cole is right, it would appear that the sensory control of the raccoon is effected more largely by means of distance sense data than that of most mammals which have so far been observed in the laboratory. Davis suggests that Cole's results in this particular are exceptional.

Yerkes<sup>3</sup> in his study of the dancing mouse presents results on the learning of simple mazes by those animals. He makes the astonishing statement that the dancer did not form a perfect habit in labyrinth A (only fairly complex). He states that the fault is not in the nature of the maze but lies in the fact that no motive for following the correct path could be made sufficiently strong (the dancer does not withstand the effect of hunger according to Yerkes). The common mice tested in this same maze learned rapidly to escape from it. In mazes of other types, by using punishment (electric shocks) as a stimulus to escape, he succeeded in establishing uniform maze habits in the dancer.

## II. TESTS ON VISION.

Yerkes<sup>3</sup> presents a satisfactory account of the reactions of the dancer to chromatic and achromatic light stimulation.

He finds that the dancer can discriminate white from black perfectly and that two grays lying as near together as Nendel's Nos. 10 and 20

<sup>3</sup> Yerkes, Robert M., *The Dancing Mouse*, The Macmillan Co., New York, 1907.

can just be discriminated. In regard to Weber's law, Yerkes states that a difference of one tenth is sufficient to enable the dancer to distinguish two lights in the case of three standard values 5, 20 and 80 hefners.<sup>4</sup>

Cole tested the ability of raccoons to discriminate black from white, black from hues, and between complementary colors. In his first test the animals in order to obtain their food had to select a box covered with black, white or colored paper. Since the employing of colored papers in tests on color vision is embarrassed by our inability to control the factor of brightness, Cole's results may be classed possibly as discriminations between grays. His black-white test is the only one where the conditions are unambiguous. In the first experiments the animals had to select the black box from the white: He found that they learn to discriminate black from white in from 70-90 trials. His later tests were made with an apparatus devised by himself and called a 'card display.' Here the different grays and colored cards were shown in succession and not simultaneously as has usually been done. He was enabled by this method to get the animals to distinguish between black-white, black-red, black-yellow, black-blue, black-green, blue-yellow and red-green. The complementary color (?) discriminations took longer than either the black-white discrimination or the black-color discrimination. He makes the important statement that the range of effective visual discrimination is extremely short, never more than 18 inches. Davis' results on visual discrimination in raccoons confirm those of Cole, except that Davis, since he presented six possibilities of choice instead of two, obtained a relatively smaller percentage of right choices.

Yerkes,<sup>5</sup> working with approximately monochromatic light filters on the dancer, is the first investigator to arrange an adequate test for color discrimination. His own conclusions are stated as follows: "Although the dancer does not possess a color sense like ours, it probably discriminates the colors of the red end of the spectrum from those of other regions by difference in the stimulating value of light of different wave-lengths, that such specific stimulating value is radically different in nature from the value of different wave-lengths for the human eye, and that the red of the spectrum has a very low stimulating value for the dancer." This conclusion, if correct, concerning the difference in the

<sup>4</sup>In my review of Yerkes' book in the *Jour. of Philosophy, Psychol. and Scientific Methods*, I misstated Yerkes, by saying that a satisfactory demonstration of Weber's law could not be obtained in the case of the brightness vision of the dancer.

stimulating effect of waves of different length, is a fundamental one in our further consideration of tests on color vision. If it be still further substantiated, it clearly shows the uselessness of testing the color vision of animals with light reflected from colored papers.

O. Pfungst<sup>5</sup> shows that nearly all of the wonderful answers returned by the horse, *kluger Hans*, were reactions to visual cues, such cues being afforded by the involuntary movements made by his questioners. If Hans could see his questioner, he could answer any question which could be answered by tapping a certain number of times with the foot. The way in which Hans reacted to the involuntary movements of his questioner may be seen in the following extract from Pfungst's book: After Herr von Osten (the owner of Hans) had stated the problem, *he tended always, involuntarily, to bend the head and trunk slightly forward*, whereupon Hans would extend his right foot and begin to tap without putting his foot back after each successive tap. When the desired number of taps was reached, Herr von Osten would, *involuntarily, give a slight upward jerk of the head*. At this second signal, the horse would retract the foot to its normal position. By this study of Pfungst we are shown the delicacy of the visual cues to which the horse can react, the width of his range of vision and the delicate functioning power of his peripheral retina.

Cole<sup>1</sup> has shown that raccoons learn easily to discriminate between square cards and round cards, and between two square cards,  $6.5 \times 6.5$  inches and  $4.25 \times 4.25$  inches respectively. The animals, owing to their previous practice in brightness discrimination, learned to make the correct responses very rapidly.

Yerkes<sup>3</sup> tested the dancer's ability to discriminate between a round food box (5 cm. in diameter and 1.5 cm. in depth) and a rectangular box (8.5 cm. in length and 2.5 cm. in depth). He found that the dancer, under the conditions of the test (direct hunger-food stimulus, without punishment), could not make the discrimination. Yerkes urges, in commenting upon this test, that the negative results obtained do not preclude the possibility that the animals might have formed the discrimination provided a sufficiently strong motive were at hand. However, in a test of discrimination between an illuminated circle and a form of cross, in which he used the punishment method, he failed to get the desired reaction.

### III. AUDITORY DISCRIMINATION.

Cole<sup>1</sup> showed that his raccoons learned to discriminate between the highest tone, A<sub>1</sub>, of a French harp, and its lowest tone, A".

<sup>5</sup> Pfungst, O., *Kluger Hans, das Pferd des Herrn von Osten*, Berlin, 1907.

## IV. TESTS ON RETENTION.

Cole<sup>1</sup> found that the retention of simple fastenings was perfect after intervals of three or four days, and in some cases even after two weeks. His tests with a box possessing very complicated fastenings (7 separate acts), which proved to be about the most difficult box the raccoons could learn, are interesting: Raccoons Nos. 3, 2 and 1 were tried on this box after an interval of 147 days. Only No. 3 showed a perfect mastery after such an interval. The other two worked almost, but not all, of the fastenings. Cole considers this interval to be about the maximum for the retention of complicated fastenings. Davis likewise shows that simple fastenings are retained by the raccoon for periods of one year. In a crucial test he found that the association of a complicated fastening persisted, with a certain loss, over a period of 286 days (including hibernation). An expression of the efficacy of retention in that instance was determined as follows: On relearning after this period, 24 trials were necessary to attain the perfect standard which had in the original learning process required 107, and the times of these 24 trials were much shorter than the first 24 trials of the primary learning process.

Yerkes<sup>3</sup> shows that the dancer's retention of a black-white or white-black discrimination may persist over an interval of from two to eight weeks. Retention of such a habit, however, is seldom perfect after four weeks. The same author shows that a habit (black-white discrimination) which after an interval of eight weeks has been lost by the dancer can be reacquired in a much shorter time than was necessary for the original acquiring of it. He gives indices of modifiability as follows:

|          | Learning. | Relearning. |
|----------|-----------|-------------|
| Females, | 104       | 42.5        |
| Males,   | 72        | 54          |

Yerkes mentions the fact that there are great individual differences in the retention of discrimination habits. In this connection he shows that the acquisition of one labyrinth habit aids the animal in learning a different labyrinth.

## V. LEARNING FROM BEING PUT THROUGH AN ACT.

A large part of Cole's<sup>1</sup> paper is devoted to proving that, contrary to Thorndike's results on cats, raccoons will learn to reenter a box of their own accord into which they have been passively dropped and then allowed to go out and get the food; and further that they can learn fairly complicated sets of acts by being put through them. Cole

generalizes on his first set of experiments as follows: "Since four raccoons exhibited this reaction, it is safe to conclude that any raccoon which has been lifted into a box and allowed to come out and be fed will sooner or later go in of his own accord, and further that he will go in before the 100th trial and probably before the 75th trial as my four animals did. The behavior of these animals forces one to believe that it dawns on the animal that he can hurry the matter of getting food by rushing back into the box and coming out again. . . . I should say, rather, that it had an image of the interior of the box as the starting point of the food getting process and an idea of going back to re-commence the process."

In order to test whether the animals could learn to undo fastenings by this artificial method of teaching the following experiments were tried: Two raccoons were allowed to learn certain problem boxes by trial and error, and two (the stupider two) were put through the acts. The average time of the first success in manipulating each of the 11 boxes was, for the animals which were put through the act, 41.6 sec.; for those not put through, 90.2, or more than twice the above average. In these tests, the animals did not always *perform the act in the way in which it had been taught*. They were put through the acts with one forepaw: they performed the acts with that paw, with the other forepaw and with both forepaws. "*And exactly the same is true of those who learned the fastenings by trial and error*" (italics mine).

The animal can be made to learn the act in the way in which he was put through it. "If the act which he is put through is the one which will remain the easiest and most convenient for him throughout the tests, irrespective of his position in the box, he will never vary from it. If not, he will employ your act when his position makes it convenient and he is looking at the latch you began with." (Surely he does not mean this statement to be taken literally!) Cole further says that the raccoon can learn and act from being put through it, even though it has failed to learn it by its own efforts.

In commenting upon Cole's results, it may be said that in his discussion he has left out one or two very important factors: First and foremost, putting the animal through a large number of times would naturally lead it to attack the *moving parts* of the apparatus when trying to solve the problem alone. In other words, putting the animal through need not tend to produce the rise of an idea; it might have the effect merely of limiting the area of attack upon the problem-box. The learning process as he describes it even when the animal is put

through was slow enough for us still to be able to call the type of learning involved merely 'abbreviated trial and error.' The fact that the animals put through did not use the same system of movements employed in putting them through the act, but one similar to those utilized by the animals which had learned by trial and error, leads one to think that what was gained by the animal was the ability to attack the problem-box at the point where the mechanism is located. Then, too, the situation is not new to those animals which have been 'put through' the problem, and the diffuse, time-consuming, motor overflows usually present on all first trials are not present in their case.

#### VI. LEARNING BY IMITATION.

Cole<sup>1</sup> maintains all through his paper that he has found abundant evidence of imagery and of the rise of ideas in his raccoons, yet he was unable to find the function of imitation present. "I have no evidence that the raccoon imitates his fellows. Long attention to the experimenter's movements apparently arouses in the animal an impulse to attempt the act itself, but this impulse may be entirely spontaneous." Davis<sup>2</sup> notes only one or two cases of possible 'instinctive' imitation, but claims that he observed no cases of imitation of a higher order of one animal by another. Yerkes<sup>3</sup> after varied and complete tests on the dancer finds no evidence of imitation: "Although abundant opportunity for imitation in connection with the opening of the doors in the discrimination box was given to twenty-five, I obtained no evidence of ability to learn by imitation." The same author's experiments upon the imitation of a climbing feat are just as conclusive in showing the absence of any tendency to imitate on the part of the dancer.

Watson's<sup>4</sup> experiments on rhesus and cebus monkeys show (in the particular animals studied at least) that the function of imitation in its higher forms is lacking. Some evidence for a circular type of reaction was offered.

Berry,<sup>5</sup> on the other hand, in a paper on the imitative tendency of the white rat finds evidence both for an instinctive and a possible voluntary type of imitation. His method of studying imitation was to allow one animal to establish an association (problem box of the manipulation type) by the trial and error plan and then to allow a second untrained animal to be present with the trained animal as the latter per-

<sup>1</sup> Watson, John B., *Imitation in Monkeys*. See this number of the BULLETIN.

<sup>2</sup> Berry, Charles Scott, 'The Imitative Tendency of White Rats, *Jour. Comp. Neurology and Psychology*, Vol. XVI., No. 5, September, 1906.

formed the necessary act. The untrained animal was then tested alone for a certain number of minutes. If he failed in the allotted time, the trained animal again showed the trick to the untrained animal. Berry lays emphasis upon the watching of one rat by another and assumes that the imitation (?) occurred through a visual process. He made no effort to test the visual acuity of the white rat, but apparently assumes that it dwells in a highly organized visual perceptual world<sup>8</sup> (which would be a *conditio sine qua non* in any act of imitation which was visually initiated). The work of Small, of Watson, and of Carr and Watson has established (if any fact in comparative psychology can be said to be established) that the rat uses kinæsthetic data for control in all situations like that of the maze; Dr. Florence Richardson (whose results are at present unpublished) has just shown that vision is practically a negligible factor in the reactions of the rat to problem boxes of the type used by Berry and that the sensory control in these situations as in those offered by the maze is kinæsthetic. In the reviewer's mind, this mass of data makes Berry's results entirely untenable so far as showing the presence of imitation in the white rat. What factors may have been present to give Berry such results are at present not known to the reviewer. Several possible ones were certainly present: Individual variation; more thorough habituation to box or part of imitatee; determination of specific stimulus (*i. e.*, position of mechanism, going out of door, etc.); but possibly more important still is the subtle way in which the presence of one animal may influence another by raising the general physiological tonus of a second animal. As an example of this I cite the following: Four female rats were especially lazy and stupid in learning the maze; each would enter, work for a few moments and then lie down. If now another animal was put in the maze, the former would immediately show signs of activity and begin again upon the problem. This increase in the general tonus of the organism as a whole was in all probability brought about partly through contact stimulation, partly through general olfactory stimulation, and through specific olfactory stimulation by the odor of the sexual organs.

The same author's<sup>9</sup> experiments upon imitation in Manx cats are almost equally open to criticism—it is still an assumption (here possibly a safe one) even in the case of Manx cats to proceed upon

<sup>8</sup>Cf. Mead, G. H., 'Concerning Animal Perception,' PSYCHOLOGICAL REVIEW, October, 1907.

<sup>9</sup>Berry, Charles Scott, 'An Experimental Study of Imitation in Cats,' Jour. Comp. Neurology and Psychology, Vol. XVIII., No. 1, 1908.

the supposition that *vision of a kind suitable to the perception of the acts of another animal* is present. His experiments were conducted upon an adult Manx female and her three kittens. The type of problems resemble in some cases those used by Hobhouse, such as getting food (with paw) from a bottle, rolling a ball into a hole, climbing down from a table, learning to catch and kill mice, etc. In all of these experiments, the author finds evidence of the presence of imitation. On the whole, the work on the cat demands slightly more scientific consideration than that on the rat, but the reviewer is far from accepting the conclusions of Berry — especially the conclusion he reaches in regard to the catching and killing of mice. To draw the conclusion that the young cat catches, kills and eats mice by imitation from such uncontrolled, experimental evidence as Berry offers — evidence obtained from only one litter of cats and from a very short part of the life history of the animals at that — comes fairly close to making inferences without evidence.

## VII. EXPERIMENTAL EVIDENCE FOR THE PRESENCE OF MENTAL IMAGERY.

Cole<sup>1</sup> cites in detail an interesting reaction on the part of his raccoons which he believes cannot be explained, even taking into account the law of parsimony, without maintaining the presence of visual imagery. The reaction referred to appeared in tests made upon the 'card display' mentioned above. Two cards, say a red and a green, were presented in succession; the animal had to react to the green card by climbing up on a high box for food, but had to remain inactive when the red card was displayed. After the animals had been tested in this way for some time, they began clawing the 'no food' card (red) down, and sometimes the 'food' card (green) up. This variation in response was fostered until some of the animals became fairly proficient in the act. Cole reasons concerning it as follows: "When the animal thus reacts perfectly to red and green, and in addition busies himself in clawing the red card down and the green card up, surely his discrimination of the two is perfect. Now we are forced to ask, *Why should he put the red card down if it did not fail to correspond with some image he had in mind*, and why, when he put the green up, should he leave it up and go up on the high box for food if *the green did not correspond with some image he had in mind?*"

The responses thus obtained are exceedingly interesting, but it certainly strains our credulity to suppose that these animals can have

separate images for a series of different shades of gray. (Cole in a later place in the paper admits that the animals so far as visual discrimination is concerned were probably reacting to the differences in the white values of the cards.) Davis<sup>2</sup> attempts with some success to offer a different explanation for the above reaction. He suggests that "*It was an accidental result of the raccoons' inveterate impulse to attack and manipulate anything that can be moved.* The animals had already associated the colored cards with the getting of food; had earlier still been accustomed to get food by attacking some sort of fastening; from this it is a short step — hardly a step at all — to attack card-holders. After having succeeded a few times in thus starting the train which leads to feeding, the activity would become stereotyped like the opening of boxes or any other." The reviewer fails to see why this explanation of Davis' is not an adequate one; it is certainly more nearly in line with what we know elsewhere of mammalian activity.

The incidental observations running all through Cole's work, lending support to his contention regarding the presence of imagery, are certainly not of a convincing character.

### VIII. THE KINÆSTHETIC CHARACTER OF CERTAIN SENSORY CONTROL PROCESSES.

Carr and Watson,<sup>10</sup> in experiments with a new form of maze, have found that the white rat trained to run the maze always from the entrance, attains orientation, when put down at unfamiliar starting points in the maze, by making certain exploring movements before getting the cue which leads to the establishment of the automatic character of the remaining part of the series of acts. By detailed experiments which cannot be cited in the review, the authors concluded that, in obtaining orientation, a *kinæsthetic cue* might serve the same purpose for the rat as a distance sense cue for man.

In this same paper the authors advance still further evidence for the general kinæsthetic character of the sensory control of these animals. This evidence came from tests on a maze, the straightways or alleys of which could be lengthened or shortened at will without disturbing the number of the turns or their relations. The animals which had learned the lengthened form of the maze and were then suddenly introduced to the shortened form, in nearly all cases ran squarely into the ends of the alleys affected by the change. On the average, sixteen trials

<sup>10</sup> Carr and Watson, 'Orientation in the White Rat,' *Jour. Comp. Neurology and Psychology*, Vol. XVIII., No. 1, 1908.

per rat were necessary to restore automatic adjustment to the changed conditions. On the other hand, the animals which had become habituated to the shortened form and were then introduced to it in its lengthened form attempted to round corners at the old distances regardless of the fact that the alley into which they then should have turned was further along in the course.

Yerkes<sup>3</sup> in testing the dancer in the labyrinth states that, after the maze is learned, probably no sense data is necessary for the guidance of these animals in the performance of such a series of acts: "A habit once formed, the senses have done their part; henceforth it is a motor process, whose initiation is conditioned by the activity of a receptive organ (at times a sense receptor), but whose form is not necessarily dependent upon immediate impressions from eye, nose, vibrissæ, or even from internal receptors. These are statements of my opinions; whether they express the truth, either wholly or in part, only further experimentation can decide." The reviewer does not know clearly what these statements mean. If Yerkes means to say that a series of acts learned in the beginning (consciously or unconsciously) by means of the activity of the distance sense receptors or of internal receptors or by means of both combined, can be later carried out by means of kinæsthetic-motor responses alone (without the accompaniment of consciousness), he would be restating merely the generally accepted teaching on habit. If, on the contrary, he means to imply that there is even in a perfectly established habit a cessation of neural functions of the internal (kinæsthetic) receptors, every case of locomotor ataxia or other sensory disturbance should lead him to change such an opinion.

It is to be regretted that neither Cole<sup>1</sup> nor Davis<sup>2</sup> in their respective studies on the raccoon devised tests for isolating the function of kinæsthetic sensations (receptions).

J. B. W.

#### THE ANIMAL MIND.

*The Animal Mind. A Text Book of Comparative Psychology.*

MARGARET FLOY WASHBURN. New York, Macmillan, 1908.

Pp. x + 333. \$1.60.

Professor Washburn's book is the second of a series of volumes on animal behavior, of which the first appeared in 1907 entitled *The Dancing Mouse* by Dr. Robert M. Yerkes, the editor of the series.

In general design and arrangement of matter the book is adapted for the purpose of a text-book of animal psychology.

The author has rendered a distinct service to animal psychology in having gathered together in compact and presentable form the results of numerous experimental researches in the field of comparative physiology of the senses and of comparative psychology.

The book is admirably planned, exhibiting a careful grading of the subject-matter in chapters, whose sequence is seen immediately to be the most logical one.

Chapter I. discusses the difficulties in the way of the comparative psychologist and the methods of obtaining and interpreting the facts. The author here gives in a few pages a brief history of this, one of the youngest of the sciences and classifies into three groups the investigators contributing to it, according to the degree in which they are willing to admit the existence of consciousness in the interpretation of animal behavior.

After a brief chapter on the evidence of mind in animals, and one on the mind of the simplest animals which presents the results of Jennings' researches on the protozoa, the author takes up the subject of sensations.

Since the ability to discriminate between stimuli is a subject which lends itself most readily to experimental investigation, four chapters are devoted to this subject, each case of discrimination between stimuli being held to be a discrimination of differences in sensation *provided consciousness exists in the animal in question*. The methods of investigating discrimination in so far as they involve observation of behavior may be given as: The method of preference; method of extirpation of a sense organ; use of localized stimuli; the independent fatiguing of reaction; difference in reaction time; and lastly, combinations of these methods. Miss Washburn states that the preference method is unsatisfactory in that no preference may exist where discrimination is possible. This is obviously true, but the value of the preference method as used by Graber need not be underestimated so long as the existence of preference gives a positive proof of discrimination. The author states that the first requisite is to give the animal a motive for its choice. To go through the process of giving the animal a motive where one already exists is superfluous, and certainly the preference method is merely the taking advantage of an already existing motive. Those who have done any extended work in the field realize that this very giving of a motive is the most tedious and time-consuming part of the experiment and is to be resorted to only when no natural motive is present. Before the preference method is denounced wholesale, it must be observed that the giving of

a motive for choice is itself a method of preference. We would wish that this method might have been added to the list, giving a method of *natural preference* and a method of *taught preference*. Both should be retained, the former being most valuable as a time saver and the latter to be used in default of the applicability of the former.

The names given the other methods are not on an equal basis, some referring to the way in which conditions are applied, while others have reference to what is expected of the animal.

The results of experiments on sensory discrimination are grouped in this chapter under the heads: The chemical sense, hearing and vision, each chapter treating of these senses in phylogenetic order.

Two chapters, VIII. and IX., consider the topic of space perception, and take up in order: (I.) Reaction to a single localized stimulus; (II.) orienting reactions; (III.) reaction to a moving stimulus; (IV.) reaction to an image; (V.) reaction to distance.

Chapters X. and XI. discuss the modification of conscious processes by individual experience. The way in which useless movements are dropped off is taken up in a review of those experiments involving the use of the labyrinth and the puzzle-box. Another form of modification, one in which the dropping off of useless movements does not seem to be the most prominent feature, is given as the learning to inhibit instinctive action, either with or without choice. The methods of studying this are in general those now used in studying sensory discrimination. The discrimination may be between stimuli presented successively or simultaneously. Pain, in Miss Washburn's opinion, is a stronger modifying force than pleasure.

The author is inclined to doubt the importance attached by some experimenters to the rôle of kinæsthetic sensations in the learning of animals. Watson concludes from experiments on the rat in the Hampton Court maze that the guiding factor is kinæsthetic, on the ground that rats, after being deprived of all the special peripheral sense organs, could run the maze successfully. Miss Washburn criticizes this conclusion in the present book as well as in a subsequent review of work with rats, suggesting that "a habit may be quite independent of the stimuli that served to form it, as the pianist becomes independent of the notes in playing a familiar piece"; that is to say, the guidance is *turned over* to the kinæsthetic sense. Kinæsthetic sensations may act as a guide in movement when other senses have aided in learning the movement. We would expect, however, that the blinded, anæsthetized animal would take longer in performing the required act, since the transfer of an activity from under the domain

of one sense to that of another always involves new coördinations, but the rats in Watson's experiments after being blinded lost no time in running the maze as compared with the time they consumed in running it before the operation; and furthermore, a fact which Miss Washburn seems to have missed altogether, the blind and the anosmic rats *learned* the maze just as quickly as the normal rats; in fact their time was a little shorter. Just *how* the kinæsthetic sensations suffice in the learning process is a question that comparative psychologists have not answered satisfactorily. It seems clear that their rôle in the human being at least is mainly that of guiding actions which have been learned through the higher senses.

In man, after an act is learned and the control is taken over by the kinæsthetic sensations, consciousness is free to be applied to other things. Now just what may be supposed to occupy the animal's attention during the learning and after the act has been learned? The writer's position on this point is not made clear. We find the statement: "As the learning process proceeds, objects come to stand in the focus of attention, so that to the cat in the puzzle box, the string that opens the door is immediately attended to. The monkey becomes aware of the difference in color between vessels otherwise quite similar." The opposite view is equally tenable, *i. e.*, that as the learning process proceeds, the objects are *less* attended to; the string, etc., setting up an immediate motor response (unconscious) while the animal's consciousness either lapses or is concerned with some other object, *e. g.*, the food. The reviewer has elsewhere suggested the idea that in such cases it is the desire for the reward, suffused with a pleasurable or painful feeling-tone which fills consciousness.

In a chapter on the memory idea the theory is propounded that memory depends upon a delay between an incoming stimulus and the reaction, so that the nervous energy may have time to impress the sensory centers. This is correlated with the view that the distance receptors—to use Sherrington's term— are most fruitful in yielding memory images since their reactions are not so immediate. That memory images depend upon associations and that the formation of associations takes more time than immediate responses seems to be the accepted way of saying the same thing. We must take exception to the statement that the distance receptors do not bring about immediate reactions. Sounds are notable for the immediacy with which they occasion motion. Again, some of the most vivid memories are of experiences which have been most momentary.

In a final chapter the writer emphasizes the factor of attention in securing prepotency of certain ideas over others.

The bibliography of 29 pages is indeed a delight to the animal psychologist. The works cited represent the best of the experimental researches in the field and would constitute an ideal library for the student of animal behavior.

We are glad to have at last a systematic text-book in comparative psychology based upon the results of actual experiments upon animals. Too often do we find that people whose interest in the question of mind in animals has led them to do more or less reading in this field, have started in at the wrong end and have unwittingly made many unwarranted assumptions as to the kind and degree of consciousness which may be supposed to exist in the lower forms.

Although the writer's indebtedness to other comparative psychologists (Yerkes, Jennings and others) is apparent throughout the book, there are several original contributions to the study, these being mostly in the way of method. The strong feature of the work is the systematization and correlation of facts. Perhaps it is most fitting that the writer of the text-book should be one not biassed by being a large contributor to the subject-matter, but one who with perfect fairmindedness and impartiality can present the results of others. This Miss Washburn has certainly done.

KARL T. WAUGH.

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## REPORTS.

### MEETING OF EXPERIMENTAL PSYCHOLOGISTS.

On April 15 and 16 the fifth annual meeting of experimental psychologists was held in Emerson Hall, Harvard University. Twenty-two psychologists representing fifteen of the eastern laboratories were present to join in the general discussion of experimental problems and to hear informal reports of researches now going forward or recently completed.

The first session was mainly devoted to subjects in the field of vision. Professor Pierce, of Smith College, described the present state of the controversy regarding the checkerboard illusion, demonstrating that the attempts at an explanation in terms of the Zöllner illusion are inadequate and that the objections do not hold which have been raised to the original explanation by means of irradiation. A discussion of the cause of the 'toy-effect' in stereoscopic vision followed, after which Professor Lough, of New York University, presented the results of some mental tests by means of a comparison of lengths; the extent of variation of judgments and the percentage of errors serve as indications of mental ability, fatigue, etc. Professor

Lough also suggested a simple method of determining the point of ocular fixation, by finding the edges of the blind spot. Professor Dodge, of Wesleyan, then described an investigation of eye-movements which, in connection with Dr. Diefendorf, he is carrying out upon insane patients. The ability of the eye to catch and follow a swinging pendulum is determined by the photographic process which Professor Dodge has made familiar. Of the cases of manic depression, general paralysis and dementia praecox which have been examined, the first mentioned group are best able to follow the pendulum, whereas the dementia praecox patients are quite unable to establish the pursuit movement.

At the afternoon session, Dr. F. M. Urban discussed the formal aspects of a psychophysical investigation now in progress at the University of Pennsylvania, the aim of which is to make an empirical comparison of the psychometric functions obtained by the methods of minimal differences and of constant stimuli. This was followed by a general discussion of the place of experimental demonstration in the elementary psychology course. Professor Warren described the procedure in vogue at Princeton, after which different members described various methods and demonstration devices which have been found of value.

Much of the second day was given over to inspection of the Harvard laboratory, with demonstration of the researches now running. In animal psychology, Dr. Yerkes reported a continuation of his studies of the behavior of the dancing mouse, the problems of modifiability and the relation between rate of learning and strength of punishment-stimulus being foremost. Imitation in monkeys, and the transfer of effects of practice in sensory discriminations of chicks, are the subjects of two other investigations. Preparations are being made to study the color vision of mice and frogs. In human psychology, one set of investigations centers about the study of individual differences. Mr. Frost has made correlations of the individual differences of a large number of mental functions in ten observers. Other students are occupied with individual differences of suggestibility, of the scope of attention, and of the rhythmical processes, mental and physiognomical. Another group of investigations is concerned with the subconscious factors of mental process. How far is it possible to voluntarily inhibit a group of associated ideas from arising in consciousness? How far is the memory for pleasant and unpleasant words different? Still other investigations have for their subjects the aesthetic division of the straight line in vertical, horizontal and diagonal posi-

tions; the motor effects of melodies; the effects of intellectual and emotional activity upon the electrical resistance of the skin, and upon the bodily temperature; and color vision around the blind spot. Professor Holt reported that a study of the mental content present when one thinks abstract and concrete terms leads him to take issue with Ziehen's assertion that there is more in mind for an abstract term than for a concrete.

In the Cornell laboratory, one set of investigations has been directed toward a study of the subconscious, with a view to reducing the limits of the term. Professor Titchener reported that Mr. Pyle and he, working on the after-images from imperceptibly colored discs, have obtained uniformly negative results: when color is seen in the stimulus there is color in the after-image, and not otherwise. Professor Bentley, continuing his experiments correlating clearness and intensity, finds that in sounds an alteration of clearness brings with it an alteration of intensity, and *vice versa*. One group of students is continuing the search for a measure of degrees of attention. Another has taken the cognition times with four pairs of stimuli—wet-dry, hot-cold, hard-soft, and sharp-blunt—and then has taken the pleasant-unpleasant reaction times to these same stimuli: the latter fall about midway between the shortest and the longest of the cognition times. The main work of the laboratory for the year centers about the study of imagination. This is pioneer work, said Professor Titchener, for the distinctive features of the imaginative consciousness, if such there be, have never been clearly determined. One way of approach is to induce cases of memory, imagination, anticipation and so on, and see from the observer's description whether any differentia can be discovered. One investigation seeks to find whether there are characteristics of an image which make it usable as an imagination image but not as a memory image, and *vice versa*. Another establishes a remarkable correlation between acts of memory and eye-movement: 70 per cent. of the instances which were unquestionably memory results give eye-movement, while 80 per cent. of the instances which were obviously imaginations give no eye-movement.

Professor Sanford reported that at Clark University a study of the process of learning type-writing showed that many of the steps of improvement come unintentionally, after which the improvements are consciously adopted. A continuation of the study of the Wheatstone stereoscope with exposure alternately to the two eyes seems to show that there is no stereoscopic effect unless the exposure periods overlap; the depth seems to be dependent upon the amount of overlapping. Other investigations are under weigh as to the mental content in volun-

tary movement; the process of the comprehension of the meaning of phrases; the effect upon the peculiar associative power of odors produced by increasing the complication of the associations; and the time required for æsthetic judgments. Dr. Porter reported investigations in progress on the intelligence of the porcupine; on vocal imitation in parrots and song birds; on the color-vision of ring-neck doves; and on the behavior of spiders. Dr. Porter finds that many of the modifications of behavior in spiders, as in weaving webs of different patterns, are instinctive rather than intelligent adaptations.

Professor Angier and Dr. Cameron were present to speak for the Yale laboratory. Dr. Cameron is making a kinetoscopic study of eye-movements in reading, these being correlated with the spoken word. Up and down eye-movements, as well as horizontal, are found. Dr. Freeman is continuing his studies of writing reactions. In the laboratory at Brown University, Professor Delabarre has in progress three researches, one upon the feelings of pressure in the ear when all sound stimuli are absent, a second upon the effect of the direction of lines in space perception, and a third upon the influence of various factors on energy. By means of tests of a clinical nature which can be used rapidly, daily fluctuations of energy, the influence of amount of sleep, diet, stimulation, etc., are being determined preparatory to a renewed study of the effects of *cannabis indica*. Professor Thorndike mentioned three investigations going forward at Teachers College, Columbia University. One treats of the relationship between the vividness and fidelity of images from one sense and that of images from the other senses, and, contrary to common opinion, finds a very high correlation. There is an 'imaginative' type. Mental measurements of twenty Salvation Army refugees and twenty university people form the basis for a general study of correlations. A third investigation seeks to establish whether the inheritance of intellectual traits is Mendelian or blended.

Full reports from some of the laboratories were not presented because of the pressure of time. As several of those in attendance were compelled to leave on the afternoon of the second day the meetings were brought to a close at that time, but a number remained for another day of visiting and inspection.

A most enjoyable feature of the meeting was an informal reception on Wednesday evening at the home of Professor Münsterberg.

Professor Warren extended an invitation to the psychologists to hold their sessions next year at Princeton.

W. V. D. BINGHAM.

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**THE**

# PSYCHOLOGICAL BULLETIN

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A PHYSIOLOGICAL INTRODUCTION TO THE STUDY  
OF PHILOSOPHY.<sup>1</sup>

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Although from time to time we read that much of so-called physiology is psychology, that too much of so-called psychology is physiology, that the physiology of the nervous system exists only by reason of psychological observations and that psychology must return more to introspective methods, there appears to be an agreement among teachers and text-book writers that a certain amount of physiology is necessary for psychological teaching and thinking. Opinions differ, however, regarding the *What?* and the *How Much?* of physiology that are essential or valuable. Beyond the barest outline of the physiology of the central nervous system and the special senses to be found in the text-books of psychology, where may the teacher or the student look for further knowledge? In English, Ferrier's *Functions of the Brain*, which was the standard at the time the reviewer was a student and which, although out of date, still remains in many respects unsurpassed, has not been succeeded by any single English work that may be utilized for the instruction of psychological students in what may be properly called physiological psychology. In both French and German, however, there are a number of books or parts of books that may be profitably placed before the more competent students of psychology, but unfortunately too few students are able to profit by the reading of the foreign language. Probably the most noteworthy of these works from the psychological standpoint are the excellent articles on the brain in Richet's *Dictionnaire de Physiologie*,

<sup>1</sup> *Introduction physiologique à l'étude de la philosophie.* J. GRASSET. Préface par M. BENOIST. Paris : Alcan, 1908. Pp. xii+368.

and those of von Monakow in *Ergebnisse der Physiologie*. In addition to these there are some special works dealing with the structure and function of the nervous system. Few, however, are like Grasset's work in that they have been written for the special or the probable use by students of psychology.

In the preface we are told by M. Benoist, the rector of the University of Montpellier, that the contents of the book were given in the form of lectures to students of philosophy in the university in accordance with a general plan of having specialists in the sciences and in other subjects allied to philosophy lecture on their own subjects to the students of philosophy and psychology. In addition to the lectures of Professor Grasset there were given lectures on certain fundamental principles of physics, biology, law and ethics, and history by the respective professors, as an indication of the value of these subjects to students of the more inclusive subject, philosophy.

Professor Grasset's book is not intended to be exhaustive in its treatment of the nervous system, but it is intended to give to students of philosophy and psychology facts and principles that may be of value to them in their work. It is divided into three parts: Definitions and Generalities; Psychic Functions; and Psychomotor and Psychosensorial Functions.

In the first part of the book is to be found the author's creed regarding the relation of physiology and psychology, and some general remarks pertaining to the point of view. The author believes that psychology and physiology are two sciences, not one science with two different aspects, as some physiologists would have us believe. Psychology is in close connection with philosophy, and it may be necessary to hold certain philosophical opinions in order to produce good work or consistent work. In physiology, however, one must have no philosophical opinions to advance and, further, one must have no special religious opinion to combat or to champion. On the other hand, the author holds that the physicist, the physiologist and neurobiologist can make their sciences serious and definite only if they have a real and a strong philosophical education. How unlike the usual or ordinary antagonism of scientists toward philosophy is the latter statement!

When we consider the body and its parts, their location and function, we are struck with the fact that the anatomical unity is not always the same as the functional unity. Thus in the stomach, an anatomical unit, there are a number of functional unities. In the study of life the functional unities are the important differentiating elements,

and it may be said that the individuality of an apparatus depends upon the function of that apparatus regardless of the geography or the topographical distribution of the apparatus or organ. "The history of the taste nerve is the best proof of the independence of the true physiological unities and of the false anatomical unities" (p. 336). It is the province of the physiologist, therefore, to determine the real unity of any organ or group of organs. In the nervous system it cannot be doubted that the anatomical unity is an artificial construction, for no one can say where the spinal cord begins and the medulla stops, nor where the cerebrum begins and the mid-brain ends, and we are compelled to concede the preponderating importance to the physiological or the functional view. In this sense we may take the remark of Lamarck: "The function creates the organ." The word organ has a definite meaning only from the physiological point of view, it is a something that does some definite thing. The organ is defined by the function that it accomplishes, and we may not properly speak of the spinal cord or of the cerebrum except in common language, because for the physiologist the spinal cord and the medulla oblongata and the cerebellum and the cerebrum do not exist as distinct unities, they are interrelated into one functioning organ. This standpoint has been taken throughout the book and we will look in vain for special discussions of the functions of the spinal cord and the peripheral nerves, or of any of the other anatomical divisions of the nervous system. We are to deal with the anatomical localization of functions, but more especially shall we read of the functions and their anatomical connections. In other words, for example, we are not to lay the emphasis on the location of the hearing centers in the temporal lobes or of the visual centers in the occipital lobes, but we must consider the relation of hearing and of vision to the nervous system as a whole. In the case of hearing it is the connection or the functional relation of the cochlear nucleus to the posterior quadrigeminal body, to the geniculate body, and to the temporal lobe that is of importance. In vision it is the similar relation of quadrigemina, geniculata, and the pulvinar and the occipital lobes that is to be considered. Moreover, in both these cases we must realize that the goal is not the cortex of the cerebrum, but that there are outgoing paths to take the centripetal impulses and to make them mean something for the individual by producing an outward expression. In this discussion the author considers the usual method of presentation of the functions of the nervous system and makes war on the habit of phylogenetic presentation, which must be largely anatomical. For the proper understanding of the functions of

the nervous system Grasset believes that we must first consider the most highly developed system and descend to the simple, not ascend from the simple to the complex. For the investigation and understanding of other bodily systems it may be advantageous to go from the amoeba to man, but we are able to understand the nervous system of the lower animals only after having considered the nervous system of man and not the reverse.

Part two is devoted to the 'psychic functions.' In this part the author discusses and defines some terms, divides mental states into two 'psychisms,' gives a critical résumé of the facts of anatomical localization of psychic functions, and considers the problem of responsibility and mental therapeutics.

The word psychic has not the same connotation as the words mental and consciousness. The psychic functions are defined as those in which there is 'thought'—not intellectual as opposed to affective, but both intellectual and affective—and which are produced or developed in the neurones of the cerebral cortex (p. 34). Consciousness is not necessarily a characteristic of a psychic state, and the mental is only a part of the psychic, for (interesting definition) psychic functions have their seat over all the cerebral cortex while the mental are located exclusively in one part or in parts of the cerebral cortex. The psychic functions are divided into the superior (voluntary and conscious) and the inferior (involuntary and unconscious), and for these two orders of psychic functions there are two different centers. The centers for the superior and the inferior psychic functions are, according to Grasset, respectively the frontal and the parieto-occipital parts of the cortex. He criticizes and combats the idea that both psychic functions are concerned with the same neurones, but with different degrees or intensities of activity, a position held by Janet, Dumas, Binet and Hitzig. To make his views more easily understood Grasset constructed the accompanying figure, which he later refers to as the 'polygon.'

In this figure *O* represents the superior psychic center or the center of conscious personality, of free will, of the responsible ego, which the author locates in the cortex of the prefrontal lobe. *A* is the auditory center, located in the cortex of the temporal lobes; *V* the visual center, located in the region of the calcarine fissure; *T* the tactile and general sensibilities, localized in the region about the fissure of Rolando; *W* the center for writing, in the cortex at the foot of the left second frontal convolution; *S* the center for speech, cortex at the foot of the left third frontal convolution; and *K* the kinetic

center or the center for general movements, located in the cortex about the fissure of Rolando. *O* represents all the neurones for the superior psychic functions, while the more numerous inferior psychic centers are represented by the polygon *WSKAVT*. To *A* go all the different auditory impressions, to *V* the visual, and to *T* the tactual and general sense impressions. From *W* there go out the impulses for graphic expression, from *S* those for verbal expression, and from *K* those for general bodily movement. This scheme represents only some of the important paths, and for completeness many more would need to be introduced from the sensory or the afferent side, such as those for taste and smell. In normal individuals, as shown

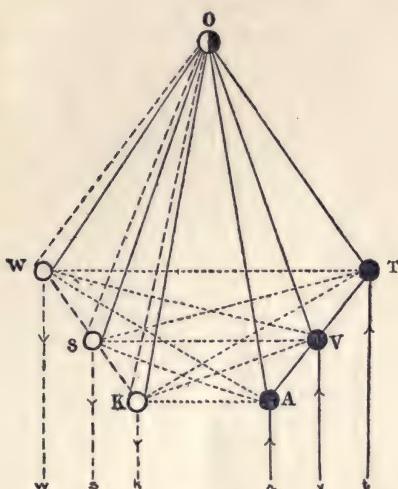


FIG. I. Scheme of the center *O* and of the polygon *WSKAVT*.

in the figure, all the different centers are connected by association paths that assure collaboration and synergy. Between the superior psychic center *O* and the motor centers *W*, *S*, *K* the author assumes not only centrifugal paths, which permit the passage of impulses from the center *O* to the appropriate motor center, but also centripetal paths which transmit impulses from the motor centers to the higher center, whenever the activity of *W*, *S*, *K*, has been produced, whether by action of the center *O* or by the activity of the centers *A*, *V*, *T* in the inferior psychic level. This last form of discharge is apparently the substrate for a form of the 'feeling of innervation.'

Using this scheme as a basis Grasset attempts to explain a number of borderland and pathological states, such as sleep and dreams, hypnosis, motor automatisms, hysteria and the insanities, and the aphasias. Lack of space prevents taking up more than a few of these in detail, but all are explained as disaggregation or dissociation of parts of the mechanism. Most are due, we are told, to a temporary or permanent functional break between the *O* and the lower polygon. In sleep, for example, there is a cessation of the function of the superior psychic *O*, although psychic activity is not entirely suspended. The continuation of the functioning of the lower psychic centers constitutes or is the neural basis of dreaming. Hysteria, which has been well described as "an enfeeblement of the faculty of psychological synthesis, a contraction of the field of consciousness, and a tendency to a more or less complete division of the personality with the formation of many independent groups," is readily understood if we accept the scheme of Grasset as indicating the manner in which all psychic states are constituted. The hysterias are from this standpoint disaggregations of the different parts of the polygon, the functional breaking away of the different parts that go to make up the normal mental process.

In the next chapter the author considers from the polygonal point of view a number of psychological problems: sensibility, ideas, attention, memory, imagination, the association of ideas and images, inspiration, reason and judgment, and will. Then follow discussions of the functions relating to the preservation and the growth of the life of the individual, of the social man, and of the species. In each of these chapters the physiological or normal function is explained and the author adds discussions of the pathology of the mental condition. In these two chapters there are collected most of the important facts of pathological psychology, a subject with which the author is thoroughly personally acquainted, in the selection of which there is shown rare good judgment.

Grasset next treats of the localization of the 'psychism' in the cerebrum. To the question: Is the psychism localizable in the cerebrum? he answers: it is localizable, but we must not hastily conclude that it has been localized. The facts regarding the sensory functions of the cerebrum are given, Flechsig's researches on the association tracts are mentioned and the opinions of many physiologists are cited to show that most investigators of the question believe the frontal lobe concerned with the higher mental processes, if we may speak of such. The author quotes the reviewer as in favor of this hypothesis, but it may be said that this conclusion was not and is not the opinion of the

present writer.<sup>1</sup> The conclusions which are made after the consideration of all the facts are that the superior psychism is not, as Janet and Joffroy conclude, merely due to a different degree of the activity of the same neurones that subserve the lower psychism, that the frontal lobes are not chiefly concerned with emotional conditions, such as gaiety or sadness, but that when they are diseased there is an escape from inhibition of the lower centers which become hyperactive, and that for the further investigation of the problem it is necessary to have more careful analyses of the mental phenomena in pathological cases.

Chapters follow on the physiopathological problem of responsibility, psychic functions in therapeutics, language, emotion and mimicry, general sensitivomotor function, orientation and equilibrium, vision, hearing, taste, smell, and the functions of nutrition. The chapters on responsibility and therapeutics are interesting largely to physicians, the former possibly also to ethical writers, although the author has published his conclusions regarding responsibility in more extended form in *Demifous et Demiresponsables*. In his discussion of language the author combats the opinions of Marie, who, it will be remembered, says that "the third frontal convolution plays no special rôle in the function of language." The neural processes in emotion are as follows: there is an excitation of certain sensory centers in which the sensation is 'perceived, becomes emotion, and from which go out a double efferent excitation'; there is a stimulation of the optic thalamus centers or rather of the basilar optic thalamic — striate nuclei centers, thence a stimulation of the inferior bulbo-medullary centers whence go the excitations for the visceral, circulatory, respiratory and

<sup>1</sup>This is not the place in which to bring forward special evidence and to elaborate personal hypotheses, but to the reviewer the following tentative hypothesis appears to be the most acceptable: All parts of the cerebrum are engaged in intellectual processes. Or, to be more exact, we may say that all parts of the cerebral cortex are so engaged. Certain parts we know have definite sensory or perceptual functions, other parts are more intimately concerned with the production of movements, and still other parts are chiefly employed neither for sensation nor for movement, but for what has been called association. The two large and important areas, anterior and posterior, of association have the same general function, that of being connecting links between the sensory processes on the one hand and the motor products on the other hand. The two areas work in harmony, but the posterior receives impulses from the sensory centers and the anterior is mainly connected with the motor centers. In the formation of an association, the following neural processes are conceived to take place: stimulation of some sensory center or centers, transmission to the posterior association area, transmission to the anterior association area, transmission to the motor area, and impulse to lower motor centers.

digestive manifestations (p. 237). The emotion itself is due to certain discharges in the upper cerebral neurones. When an impression reaches the psychic neurones it produces the mental state sensation ; "if the process be further complicated and it extend to a greater number of neurones the sensation becomes agreeable or disagreeable and there is pleasure or pain — if still further complicated we have an emotion, joy or sadness" (p. 83). The area about the fissure of Rolando is believed to be sensorimotor rather than divided into a motor region anterior to the fissure and a sensory region posterior to the fissure, as the clinical and physiological results teach. The occipital lobe is also both sensory and motor, and the hearing center has a similar combination of functions. The validity of these conclusions is, the reviewer believes, questionable in view of the many facts that have recently been collected by pathologists, clinicians and physiologists, and the author in these chapters appears an advocate and not a judge.

Although he uses his scheme of the polygon throughout and thus appears to have a materialistic standpoint, the author keeps in mind the fact that the mental state is not the anatomical nor the physiological condition. For him the mental state is something that is not the same as the action of the neurone, something that cannot be explained in terms of the physics and chemistry of nervous tissue. It is refreshing to pick up a book written by a physician and find that not only has the old anatomical standpoint given way to a functional one, but that the distinction is drawn between the purely functional and the mental.

Two serious defects of the work are the lack of an index and the absence of any quantity of references. Most of the references that are given are to French authors and magazines ; full references to German authors are almost lacking, although names of both German and English investigators are mentioned.

For its standpoint and its numerous facts the book may be recommended ; it appears to the reviewer that it will be more valuable to teachers than to students. For the use of students a little more anatomy would be helpful and this could be included without augmenting the size of the work if the chapters on responsibility and therapeutics were omitted. The illustrations are well selected and sufficiently numerous, and it is a relief not to find all the worn out cuts of earlier works. A translation of the book, with additions of chapters on anatomy, of an index and of a bibliography would fill one of the gaps in our series of physiological and psychological text-books.

## PSYCHOLOGICAL LITERATURE.

### PHYSIOLOGY OF HEARING.

*An Introduction to the Mechanics of the Inner Ear.* MAX MEYER.  
University of Missouri Studies, Science Series, Vol. II., No. 1,  
1907. Pp. vi+140.

Meyer, as is well known, rejects not only the basilar membrane hypothesis, but also the entire resonance theory of audition, his reasons being, on the one hand, the difficulty which any resonance hypothesis finds in coping with some of the commonest phenomena of combination-tones, and on the other, the physiological consideration that no living tissue can be subjected without alteration of form to the conditions of unvarying tension which the resonance hypothesis demands. In the monograph before us his own mechanical theory of audition, first propounded some twelve years ago, is set forth in a continuous and systematic exposition, as far as the present condition of experimental and anatomical knowledge has permitted of its development. It is couched in untechnical terminology which any reader can follow.

The cochlea is a narrow tube some two centimeters in length. It is filled with lymph of such a density that the rate of sound transmission in it would be about 1,400 meters per second. This means that a sound in the middle region of the scale would have a wave-length of several meters. Consequently, to speak of sound waves travelling up and down the cochlear tube is like speaking of a horse race in a dog kennel. It is better to regard the fluid as practically incompressible, and hence as of uniform density throughout at any given time. When the sound waves of the air actuate the tympanic membrane and the chain of ossicles, the foot-plate of the stapes, which fits into the oval window of the cochlea, executes a piston-like movement and forces this incompressible fluid to move, the elastic membrane of the round window making this possible. Such a mass movement in the lymph is not to be confused with wave-motion.

If the cochlea, with these two windows at one end, were a plain tube, only that portion of the fluid which lies between the windows would be set in motion. But the windows are separated by a partition which extends almost to the opposite end of the tube. The au-

thor uses the term 'partition' to cover the whole organ of Corti, and not merely the membrana basilaris. This partition is not rigid like a wall of bone; neither according to our author is it elastic like a rubber membrane. Its physical properties are more like those of soft leather. As a rough illustration of the way in which such a structure might act, one may think of a leather-seated chair. Pressed from below the seat bulges upwards, offering almost no resistance at first, but soon stops abruptly. It will remain in this position until pressed from above, when it bulges downwards again until it reaches its lower limit.

Now if the partition in the cochlea is of this flexible but inelastic sort and can move up and down within narrow limits, the result will be that when the stapes begins moving inwards the part of the partition next to the windows will begin moving downwards. It soon reaches its lower limit and becomes unyielding. Continued inward motion of the stapes will gradually cause further and further portions of the partition to be depressed until the motion of the stapes is reversed. With this change of motion, the particles of fluid nearest the windows (not those that have moved down last) move upwards and raise the corresponding portion of the partition to its upper limit; then the parts farther from the windows are gradually raised as before. Any motion of the partition, whether up or down, begins at the point nearest the windows. The membrana basilaris is the strongest part of the partition, well adapted to resist the pressure of the fluid above and below. Upon it rest the rods of Corti, so placed as to at once support and protect the delicate hair cells whose hairs protrude upward into the membrana tectoria. When a portion of the partition bulges downward, this membrane pulls the hairs slightly, causing a single shock in all the nerve fibers which terminate about the hair cells of this part of the partition. If two or more of these shocks follow in rapid succession, a nervous process is set up whose special character is dependent upon the frequency of the shocks. The pitch of the perceived tone is consequently for this theory not a function of the particular sensory or cortical nerve cells stimulated, but corresponds to a particular kind of neural process which can take place in any one of thousands of neurones, and whose nature is determined by the rate of stimulation of the sensory cells. Loudness is correlated with the amount of neural stimulation: for instance, with great intensity of sound the amplitude of movement of the stapes is of course wide, the strip of the partition moved up and down is long and the number of hair cells stimulated is correspondingly large.

How is this theory to explain the simultaneous perception of several distinct tones? If the movements of the stapes when acted upon by a complex sound wave were such as to cause one portion of the partition to move up and down at one rate and other portions at different rates, the path would be open toward an explanation of clang analysis. This is precisely what this theory finds to be the case. The major portion of the monograph is devoted to a determination, by graphical methods, of the precise way in which the partition is affected by complex movements of the stapes. To simplify a problem which would otherwise be incapable of solution, several provisional assumptions are introduced regarding the shape and elasticity of the partition, the distribution of nerve termini over it, etc. Not all of these provisional assumptions are employed at once, but their use is varied in different cases in order to determine the significance of each one. The first analysis described is that of the curve representing the combination of two tones whose vibration rates are as 2 to 3, the consonant interval of the 'fifth.' It is shown that, in a unit of time, the portion of the partition nearest the windows will be moved up and down three times, an adjacent portion will be moved twice, and a third section once. The hair cells on these three parts of the partition, then, will mediate three tones, the first corresponding to the higher objective tone, the second to the lower, and the third to a tone an octave below the lower tone, the so-called 'subjective' difference-tone which the attentive listener hears whenever two tones of the vibration ratio 2 : 3 are sounded together. This relatively simple case illustrates how the author's theory undertakes to explain the facts of clang analysis and combination-tones without employing the hypothesis of physical resonators in the ear.

The particular phase in which two sound waves are combined can make no difference for hearing, according to the resonance hypothesis. According to our author's mechanical theory, varying the phase may make a difference in the relative intensities of the tones heard, a difference which is negligible for the most part but which may under certain circumstances become significant.

The theory proves to be especially adapted to meet the facts of relative intensities of difference-tones. These vary with the absolute pitch and absolute intensity as well as with the relative intensities of the two primaries. These variations are explainable in part by reference to the shape of the partition, which is only one twelfth as wide near the windows as it is at the far end of the tube. The width does not increase uniformly from one end to the other, but rapidly at first

and then more slowly. A unit movement of the stapes will displace a longer portion of the narrow part than of the wider part, and so bring about the stimulation of a larger number of nerve endings. The biological value of the resulting heightened efficiency of the weaker sounds is pointed out.

In its further elaboration, the theory is found to furnish an explanation of the phenomena of beats, of 'roughness,' and of the intertone which is heard when the primaries are about a semi-tone apart. (The author calls this the 'mean tone,' evidently being unfamiliar with the expression which the English writers have used as a translation of the German 'Zwischenton.') No attempt is made to handle such pathological phenomena as tonal islands and pitch-difference of the two ears.

The theory does not pretend to be an ultimate solution of the problems, but rather, a guiding plan for further experimental research in a field that has been unduly neglected. This mechanical theory offers a promising key to an explanation of intensity and clang-analysis; but it does not as yet, except in the vaguest and most tentative way, attempt to explain pitch.

The reviewer joins with the author in the hope that the monograph may provoke a fresh attack upon the problems of audition, problems whose solution calls for the coöperative efforts of anatomist and experimentalist.

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*A Restudy of the Minute Anatomy of Structures in the Cochlea with Conclusions Bearing on the Problem of Tone Perception.*  
GEORGE E. SHAMBAUGH. Am. J. of Anatomy, 1907, VII., 246-257.

In this article the author holds the Helmholtz hypothesis untenable for the reason that he finds that a part of the membrana basilaris is so constructed that it will not admit of vibration, and that in many cases perfectly formed parts of the organ of Corti have been found where this membrane does not appear at all. His contention is that the hairs of the hair-cells of the organ of Corti, where the physical impulses of sound are transformed into nerve impulses resulting in tone perception, project into the under surface of the tectorial membrane and that stimulation is accomplished by vibrations of this membrane which are transmitted to it from the endolymph. The tectorial membrane, he believes, because he finds that it varies in size from end to end and is of a lamellar structure which renders it capable of acting as a reso-

nator, responds at a given place to a given tone, thereby stimulating certain of the auditory end-organs and consequently causing the perception of the tone corresponding to the given vibration.

The writer of this article is not alone in his contention that the basilar membrane is not a vibrating structure. In 1892, Howard Ayres, writing in the *American Journal of Morphology*, holds to this position, because he finds that the basilar membrane is composed of several sheets of fibers and cell masses and that its phylogenetic history shows it to be a modified portion of the skin which always serves as a floor on which the sense organs rest. He claims that the tectorial membrane is simply a waving field of long hairs springing from the top of the hair cell and floating freely in the endolymph. Dr. K. Kishi, in the article in *Pflüger's Archives* reviewed below, also agrees in many respects with the writer.

C. E. MOFFITT.

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*Corti'sche Membran und Tonempfindungstheorie.* K. KISHI.  
Archiv f. d. ges. Physiologie (Pflüger), 1907, CXVI., 112-123.

Kishi begins by deplored the present vacillation and uncertainty regarding the theory of tone sensation, and surmises that the obscure problem will be solved only when the anatomical structure of the inner ear is rightly understood. His studies of the labyrinth first led him to doubt the wide-spread view that the membrana basilaris is a vibrating structure; for the layer of basilar fibers is protected from the vibrations of the labyrinthine fluid by two thicker layers above it and two below. And even if the basilar fibers could be set in vibration, they are not in an advantageous position for actuating the hair cells and so stimulating the auditory nerve. The properties of a system of selective resonators, which Helmholtz assigned to the membrana basilaris, Kishi attributes to the little understood membrana tectoria. This conclusion is based upon investigations of the position, the physical constitution and the finer structure of this membrane. He shows that the membrana tectoria, which grows out from the labium vestibulare and extends over the organ of Corti, does not float free above the hair cells as has often been thought, but is always attached to the edge of the reticular membrane. As to its physical condition, he decides that it is very delicate but highly elastic, which accounts in part for the distortions and the bulging form usually observed in microscopic preparations. As to its finer structure, the membrana tectoria is found to consist of two layers of fibers which in the normal condition Kishi

believes to be stretched above the organ of Corti in such a manner that, when set into sympathetic vibration by sound-waves in the endolymph, they act directly upon the protruding hairs of the hair cells.

In the opinion of the reviewer, this paper taken together with Shambaugh's presents a strong case against the basilar membrane theory of audition. But Kishi's hypothesis that the membrana tectoria is made up of stretched fibers which serve as selective resonators is rendered extremely improbable by the admirable work of Shambaugh. The theory which the latter writer substitutes is, however, from the standpoint of the physicist, untenable. One feels that the anatomists have as yet failed to discover in the cochlea any structure which is physically capable of satisfying the requirements of the Helmholtz resonance theory of audition.

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### PERCEPTION OF THE VERTICAL.

*Influence de la force centrifuge sur la perception de la verticale.*

B. BOURDON. *Année psychologique*, 1906, XII., 84-94.

This investigation is, as its title implies, an experimental study of the effect of centrifugal force on judgments of the vertical during rotation.

With apparatus so arranged that the speed of rotation could be regulated with accuracy and so that his results could be automatically recorded, M. Bourdon made five different sets of experiments on the perception of the vertical and a sixth set on the torsion of the eyes during rotation. The first three of the sets of experiments were with the tactual perception of the vertical and consisted of: (1) Placing a rod vertical—the body being vertical and the head movable. (2) Placing a rod vertical—the body being vertical and the head immovable. (3) Placing a rod vertical—the body being vertical and the head inclined 10 degrees (that is, an amount equal to the angle formed with the vertical by the resultant of gravity and the centrifugal force). The fourth set of experiments consisted in placing the head itself in such a position that it seemed vertical; and the fifth set consisted in determining the apparent visual vertical.

M. Bourdon interprets his results as according perfectly with the hypothesis that when we turn in a circle we take for the vertical the direction of the resultant of gravity and the centrifugal force. That the figures given in the five series of experiments do not accord with

this resultant (being on an average between two and three degrees too small) he considers as simply confirming this hypothesis, since if instead of seeming to be inclined 10 degrees from the vertical I am actually so situated I obtain exactly the same results as those reported.

The fact that the apparent visual vertical showed less inclination than that of the other four cases M. Bourdon interprets as due to the torsion of the eyes, which he found to amount to between two and three degrees for the speeds used. He does not think, however, that torsion of the eyes plays a very considerable part in the illusion of the apparent visual vertical, since the difference between the results in that case and those in the other four cases was not very great. This conclusion, however, is contrary to that of Breuer and Kreidl obtained as a result of their investigations as published in *Pflüger's Archiv*, Bd. 76, p. 494 ff.

One practical conclusion which the author draws from his investigations is that it is of little use to employ the method of rotation for the study of the perception of the vertical and the role of the internal ear in its perception with the deaf, since if they show abnormalities when rotated they would show equal abnormalities if they were simply inclined an amount equal to resultant of gravity and the centrifugal force which would be used if they were rotated.

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#### ATTENTION.

*Attention.* W. B. PILLSBURY. Pp. x + 346. Library of Philosophy, edited by J. H. MUIRHEAD.

A somewhat ambitious treatment of attention is given by Professor Pillsbury in the volume which he contributes to the *Library of Philosophy*. The title leads us to look with interest for information on a subject of such importance as attention. The further we look, however, the more disappointed we become. Instead of finding out much about attention we come across discussions on the effects of attention, the conditions of attention, attention and ideas, attention in memory, attention and reason, etc. A miscellaneous amount of information is given in connection with memory, reason, emotion and the like, but attention itself receives a very subordinate place. Attempts to amplify a subject by telling of others connected with it remind one of the advertisements of the various breakfast foods, which are good *with* cream and fruit, *with* honey, etc., but which in themselves are somewhat insipid.

It is reasonable to suppose that an author in working out a subject has his field carefully defined. If he has no such field at the beginning, at least he should give approximate limitations after he has investigated the subject. We read through Professor Pillsbury's volume in vain for light in this connection. He seems to take Titchener's conception of attention as a state of clearness and at times seems to endow it with the powers of a separate activity. The first view, however, is much more clearly stated by Titchener, while the latter has no place in any modern discussion of attention. The only attempt at definition which I have been able to find is marred by the somewhat confused sequence of words in which it is given. I quote it so that the reader may judge for himself. "Attention as a state is the clearness of some one idea with its resulting analysis or synthesis. Attention as a cause is an expression of everything that the man has known and experienced, and accompanying and colouring the whole are the feelings of interest and effort, together with the movement processes that make known the degree of attention to others" (p. 293). How attention may be both a cause and an expression is not explained.

With the peculiar bias which many so-called experimenters in psychology have of ignoring the analysis and the genesis which are so prominent in such subjects as chemistry, biology, physiology, etc., the author fails to appreciate the work done by others in these fields of attention. Moreover, glaring errors are made in statement of fact and either misconception or lack of information is shown in a number of instances. For example, on page 77 the author speaks somewhat positively of fatigue of nerve cells. Now as a matter of fact nothing definite in this connection is known. (See Howell, *A Text-Book of Physiology*, 1907, p. 129.) To base a theory positively on such fatigue is to juggle with an hypothesis, a process of which the author speaks so disdainfully in his preface. Again, on page 102 the author goes to James Mill for the secondary laws which determine the strength of association. One who has read in the British associationists, however, should know that Brown gives such laws much more fully and clearly. (See his *Phil. Hum. Mind*, Lect. XXXVII.) Moreover, one who can ignore such psychologists as James and Baldwin in this connection should not at least pass by the work done by Calkins, work which is experimental, scientific and of the kind the author pretends to follow. Calkins establishes the secondary laws of association for which Pillsbury has to search in the pages of Mill. (See Calkins, "Association, An Essay Analytic and Experimental," *Psych. Rev. Mon. Sup.*, 2: 1896.) Passing by such work looks

much like special pleading. Again, one might expect a student of Titchener's to be familiar with the similarities in the theory of association between Wundt and Herbart. No notice, however, is taken by Pillsbury of the similar treatment of *Verschmelzungen* and *Complicationen* given by Herbart (*Sämmt. Werke*, Hartenstein, 5: 21-26), and by Wundt (*Grundzüge*, 3: Ch. XIX.). Pillsbury also makes the remarkable assertion that Stout's theory of apperception in the *Analytic Psychology* becomes one of activity in the *Manual*. Stout himself gives no suggestion of this. Both in his *Manual* and in his *Groundwork* Stout returns to the first love of his predecessors, association and ideal revival, though dealing with them in a more modern manner. In treating of the history of the theories of attention, Pillsbury begins with Mill and leaves out many authors of account. His selection in this connection is somewhat erratic. Of the writers of the same stamp as Mill he ignores Locke (*Essay*, Fraser's edition, 1: 194, 299), Reid, Brown and Hamilton. Mill may be a more important writer in connection with association, but as far as attention is concerned, he is of no more account than the others. I may here note that a much more systematic and thorough account of the theories of attention is given in Calkins' *Introduction to Psychology*.

The whole work of Professor Pillsbury seems more like an incomplete outline of psychology than a treatise on attention. Little of attention as such is given. What is given can be found more clearly and more fully stated in such books as Titchener's *Outline or Experimental Psychology*, Angell's *Psychology*, Baldwin's *Handbook*, and others. Original treatment might have been possible in an investigation of the motor aspect of attention. This, however, receives scant attention. In fact, Pillsbury calls in association centers to explain reinforcement and inhibition.

The most important application of the theory of attention is in education. As I have already stated, there is little given in connection with attention as such. Still less is presented in connection with education. The last chapter is one of the kind which throws psychology into such disrepute among teachers. The somewhat hackneyed advice is given, to know the child, to arrange lesson material properly, to give instruction of social value, etc. No mention is made of the doubtful character of any general power of attention, nor is there any notice of the work of Thorndike and Woodworth proving the impossibility of any general power (*PSYCH. REV.*, 1901). There is consequently no discussion of the dogma of formal discipline, of the relation of the course of study to attention and inter-

est, nor are there given any practical suggestions to be followed in instruction.

The work of Professor Pillsbury is disappointing. We might expect something like it in a volume from a *Library of Philosophy*, but hardly from a writer claiming scientific definiteness and accuracy.

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### ASSOCIATION.

*The Loss of Associative Power in Words after Long Fixation.*

E. SEVERANCE and M. F. WASHBURN. Amer. Jour. of Psychol., April, 1907.

This paper reports an investigation of the familiar psychological phenomenon, which consists in the appearance of strangeness taken on by a word after long fixation.

Words of six letters without capitals, printed in long primer type, were placed on a background of white paper. Six women with some experience in introspection acted as observers. The subject was told to look fixedly at each word for a period of three minutes, describing all the changes undergone meanwhile in its appearance.

It was found that the meaning of the word and its auditory motor image disappeared from consciousness a few seconds after fixation. Fragments of the visual word sometimes assumed special prominence, and produced distinct auditory-motor images, which in a few cases alternated with the original word in consciousness. Later all sound and meaning elements would vanish yet the combination of visual elements retain a certain familiarity. This familiarity would then in turn vanish leaving a mere collection of letters which at last lost their identity and appeared as merely a group of strange marks.

In the first stage the word often tended to fall into symmetrical divisions, and retained both meaning and familiarity longer when these divisions corresponded with its syllables. Letters tended to associate their normal individual phonetic value. In the third stage letters of striking form such as *a* and *s*, *m* on account of its greater length, and the reversible letters such as *p* and *q* stood out with especial prominence.

The following explanations are offered by the author for these phenomena. The visual image is less closely connected with the word's meaning than is the vocal, and when the latter disappears from consciousness the meaning accompanies it. The loss of familiarity is probably due to the excessive predominance of certain parts of the word, due to the fluctuation of attention within such narrow limits.

The final loss of the familiarity of the letters themselves the author explains as a phenomenon similar or identical in nature with that displayed in the first stages of auto-hypnosis.

It would have been interesting had the experimenters tried a longer period of fixation in order to determine more exactly the relation between hypnotism and the phenomenon under investigation.

*Ueber Assoziationsexperimente mit Beeinflussung der Reproduktionszeit.* E. MEUMANN. Archiv für die Gesamte Psychologie, IX., 117-150.

The problem here investigated is the difference in reaction time and the significance of association content, due to the form of instruction given to the subject.

The same series of words was twice given to each subject, once with each of two types of instruction.

The first type was briefly as follows: Concentrate your effort especially on producing an association as quickly as possible, leaving everything else to chance. The second type may be summarized thus: Do not react until you have exactly grasped the meaning of the word, and are sure that your answer is connected with this. Take as much time as you need and avoid haste and mental strain.

Measurements of time were taken with the Zimmermann chronoscope.

The author found that the subjects studied grouped themselves into two classes. By the first class, the first type of instruction was reacted to after a remarkably short interval. The associations were almost entirely such as the author terms non-significant, or those upon which he looks as being entirely the result of vocal and auditory habit. Such are bad, good; ice, hard; snow, white. This class of subjects when experimented on with the same words under the second type of instruction took more time than before, but their associations did not change materially in character.

The other class of subjects reacted more readily under the second class of instruction, their responses showing more concrete association. When experimented upon under the first type of instructions they were at first so confused by the distraction of attention to the time element that they were even slower than before in their reaction but became somewhat more rapid with practice.

The author points out that the uniting of the two instructions to 'get the full significance of the word' and 'react as soon as possible' is fatal to any possibility of achieving results of real value, because

of the tendency of some to emphasize the first and others the last half of the instructions. To this he attributes the wide variation in reaction time found in the results of the association experiments of various experimenters.

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*Some Experiments in the Associative Power of Smells.* E. M. BOLGER and E. B. TITCHENER. Amer. Journ. Psych., XVIII., 326-327.

"This brief communication may be regarded as a foot-note to the study published under the same title in 1905 [in this same journal] by Misses A. Heywood and H. A. Vortriede." The question at issue is the possession on the part of odors of a peculiar power to revive past experiences. The method in both studies was a modification of Miss Calkins's form of the method of right associates. The present experimenters introduced the important variation of suffusing with the scents themselves the pictures to be linked with the several odors. Thus, like the reminiscent odors of ordinary life, the smells were bound up with 'a varied and complex visual stimulus.' The writers, however, reach, like the Vassar experimenters, a purely negative conclusion. The odors proved no more effective in recall than did nonsense syllables (auditory stimulus) and proved distinctly less so than did simple geometrical figures drawn with ink in the corners of the pictures.

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*Gustatory Audition; A Hitherto Undescribed Variety of Synesthesia.* A. H. PIERCE. Amer. J. of Psych., 1907, XVIII., 341-352.

The unique feature of this case of synesthesia is the "experiencing of gustatory qualities following upon the hearing of words spoken by the human voice, or of musical and other non-vocal sounds." The gustatory qualities include "all the possible experiences that the sense organs of the mouth can give," the four taste qualities, pressure and temperature, and tactual-motor qualities. Olfactory sensations are not present. The article contains an extensive list of gustatory equivalents for words, nonsense syllables, and musical tones, heard by the subject, such as, Dolly, sweet; Eunice, sour or pain; idle, salt; amethyst, bitter; noise, cold; cause, hot; Ethel, pressure; Ben, tactual-motor. These gustatory associations were very distinct and followed

quickly upon the hearing of the words. "The subject feels as if she were actually having in the mouth the described substance." "The best condition for the appearance of the synesthesia seems to be a state of natural hunger." Professor Pierce enumerates several apparently valid reasons for regarding this as an actual case of synesthesia and not a case of artificial imagery.

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### PRACTICE, HABIT, AND LEARNING.

*General Practice Effect of Special Exercise.* J. E. COOVER and FRANK ANGELL. Am. Jr. of Psychol., 1907, XVIII., 328-340.

This investigation is a contribution to the answer of the question: Does improvement in one kind of mental activity extend to other mental processes more or less remote? In other words, it is concerned with so-called mental discipline.

Two groups of experiments were made: (1) Test in light discrimination with training in sound, (2) test in the use of a typewriter with training in sorting cards.

The methods of procedure, essentially the same in the two experiments, were in brief as follows: (1) The subjects underwent a period of training in one mental activity, with tests of efficiency in an altogether different activity before and after the training. (2) Care was taken to eliminate all identical motor elements, so that any possible improvement might be attributed only to some general factors. (3) Account was taken of the training effect of the preliminary test by means of control reagents, who were subjected to the tests without the training.

The conclusions are the more obvious in the first experiment. The color-discriminating ability of the subjects showed marked improvement, for which it is certainly difficult to find any explanation other than the preliminary training in sound-reactions. Introspections noted by the control reagents gave evidence of the distracting effects of varied and fantastic imagery in both preliminary and after-tests. The test reagents, on the other hand, in their final tests seemed to have reduced this to a minimum. Improvement, then, appears to depend largely upon the elimination of all unessential and distracting factors, and upon freeing the judgment from illusions such as these might occasion.

In the second experiment — the effect upon typewriting of training in card sorting — the data seem somewhat ambiguous. There is an

increase of errors along with an increase of speed; this, however, the investigators attribute to the development of a strong rhythmical tendency as the action becomes more mechanical. Introspective notes as well as the results of the actual tests seem to indicate that here also improvement was due to general rather than special factors. There was an increased general facility of accomplishment, together with a greater degree of confidence gained during the training interval. Since on the other hand the control reagents displayed much less skill and considerable more embarrassment in their final tests, the reasons for this radical difference would again seem to lie in the general practice effects of the training interval.

The general conclusions of the investigation are, then, that improvement gained in one process may be transferred to another. "Improvement seems to consist of divesting the essential process of the unessential factors," and the factors in this transfer of improvement are due in great part to habituation and to a more economic adaptation of attention, *i. e.*, are general rather than special in character.

The fact that the results found by Coover and Angell differ from the conclusions of other investigators makes it very desirable that the question be submitted to the most rigid experimental investigation. There are few, if any, questions of more fundamental importance to education.

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*The Psychology of the Learning Process.* LUCINDA PEARL BOGGS.  
Jr. of Phil., Psychol. and Sci. Methods, 1907, IV., 477-481.

Basing her article in part on Herbart's pedagogy and psychology, Miss Boggs leans perhaps too much toward philosophy instead of using the many experiments that have been made in the psychology of learning.

When learning is taking place in the best way there are, according to our author, four things that should be taken into account. First, the proper attitude of the mind is a 'state of inquiry.' One never learns anything while in a condition of indifference. Secondly, the 'content of the mind' also determines the success of the learning Process. In this, interest must necessarily play a great part.

In the third and fourth divisions there seems to arise a too delicate division of the subject-matter. The author speaks of 'the form of the content of consciousness' and 'the structure of consciousness.' In dealing with the content of consciousness, the process of real learning

is making the subjective objective. School-room methods are too much occupied with getting a clear language expression of the content of children's minds. In the hurry to complete a given topic time enough is not allowed for the ideas to expand, subconsciously, in the child's own way, and this hot-house growth gives an artificial product. Everything that exists for our consciousness has to be worked over in our own brain. The teacher cannot take it for granted that the pupil has the same consciousness in dealing with exactly the same material, and even in the same form, when learning, that exists later when the subject is learned.

By the structure of consciousness the author means memory, imagination, inductive and deductive reasoning. She agrees that memory is necessary where the aim is to solidify the objective language statement, but this comes after the learning process is completed, when the subjective has been made objective, and conforms to the definite relations of time and space, of cause and effect. Learning, on the other hand, is a condition of mental integration and disintegration in which the ideas are as yet too indefinite and vague for memorization, and here imagination, the prevailing organization of children's minds, as the author finds, must have free scope.

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*The Psychology of Chess and of Learning to Play it.* ALFRED A. CLEVELAND. Amer. Jour. of Psychol., 1907, XVIII., 269-308.

Like many other games which arouse intense interest, chess owes its popularity to its appeal to the fundamental instinct of combat and to the fact that it opens the way for origination and invention. Cleveland describes the game of the average player and cites instances of remarkable feats of well-known chess masters, and then takes up the learning process as illustrated by the game. The player, after passing through the various stages of growth in skill from a condition in which he can plan only the next move, reaches a condition in which he is able to think out a long line of defense and attack. The preliminary details are now becoming automatized and the mind is left free for the larger aspects of the game. At this stage of the learning process the beginner has more knowledge than he can put to practical use; his mind has grasped many details which it has not yet organized for ready employment. The player who has reached a reasonable degree of skill has learned to use large units of thought. He is enabled to make short cuts in planning by ignoring the intermediate steps which would otherwise hamper his outlook.

Cleveland agrees with Swift in finding that skill, instead of being diminished, is more often increased by a period of rest.

In conclusion, Cleveland considers that the progressive organization of knowledge is the most important psychological feature in learning chess, though a good visual imagination or its substitute in some other form of imagination, such as auditory, is desirable.

The article, while complete in other ways, does not give in sufficient detail the factors of the learning process which are peculiar to chess. For instance, attention and association are used in too comprehensive a way without sufficient analysis to determine the other mental processes involved in the group of activities to which these terms are applied. The article, however, is valuable as a contribution to the psychology of learning.

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*Mathematical Prodigies.* FRANK D. MITCHELL. Amer. J. of Psych., 1907, XVIII., 61-143.

The object of this paper, as stated by the author, is three-fold: “(1) To give a summary of the mathematical prodigies described in the literature of the subject. . . . (2) To give a brief account of the writer’s own case. . . . (3) To set forth a new theory of mental calculation.”

We may pass over the first two sections of the work with a few words. In the first the various prodigies recorded in history, some twenty odd, are treated of in detail with respect to their mathematical abilities, heredity, education, etc. The source for these accounts appears largely to have been found through references in Scripture’s earlier article on ‘Arithmetical Prodigies’ (*Amer. J. of Psych.*, 1891, IV., 1-59). This original work of Scripture is treated throughout with a rather carping criticism, to some extent no doubt justifiable, but on the whole rather annoying in its petty detail.

In the account of his own case the author reveals certain of the methods and tricks of calculation, and lays the basis for his theory by deriving the calculating ability from a natural interest quite prior to all knowledge of or education in mathematics. As to the theory, he develops it from counting, and lays stress on the natural tendency towards a precocious skill in this direction. Education, therefore, is of little avail, and indeed may act as a hindrance to the development of this natural tendency.

Three grades of ability are differentiated: (1) Pure counting in abbreviated form, which takes into account the properties and short-

cuts in numerical operations, and cannot even be called arithmetical. Persons possessing this grade of ability are termed 'calculating prodigies.' (2) A distinctly arithmetical point of view is developed in the 'arithmetical prodigies' whose operations are shown to be true calculations rather than dealings with the mere properties of numbers. (3) Real mathematical ability is found in the 'mathematical prodigy' whose powers are distinctly algebraic and generalizing. It will thus be seen that mental calculation and mathematical ability are essentially independent, and we are made to understand how a high degree of calculating ability may be combined with dense ignorance and illiteracy.

Although developing primarily from counting, it is shown that the favorite operation of the mental calculator is not addition and subtraction but multiplication. Various unique forms of multiplication are described, but as for the extended multiplication table, except in two of the cases studied, the author finds no evidence for its use nor any real need for its acquisition.

Binet's conclusion that mental calculation combines two distinct and independent elements, memory and calculation, is rejected. Memory is declared to be of importance only in the service of the calculation, and not as a distinct capacity.

As to memory type, the author takes issue with Scripture, who found three of the calculators here treated to be notably visual, and assumed that the visual factor was probably the most important one for all such operations. According to Mitchell's analysis the three named by Scripture as visual are rather to be considered auditory in type, and the general conclusion is that the auditory is probably the more natural method since the calculator usually develops his ability before he learns to read or write. In the opinion of the reviewer the evidence on this point is insufficient. The author's main criterion for the auditory 'or auditory-motor' type is a tendency to articulate. But the necessary combination of auditory with motor factors is by no means self-evident. Netschajeff<sup>1</sup> experimenting on 700 Russian cadets found that he could classify but 11 per cent. as belonging to one of three types: visual 5 per cent., motor 4 per cent. and auditory 2 per cent. Forty-nine per cent. could be classified as favoring a combination of two forms of imagery, 32 per cent. being visual-motor, 12 per cent. visual-auditory but only 5 per cent. auditory-motor. Experimentation on this subject is attended by many diffi-

<sup>1</sup>Ueber Memorieren; Sammlung von Abhandl. aus dem Gebiete der Pädag. Psychol., V. Band, 5. Heft, Berlin, 1902.

culties, and I shall not assume absolute trustworthiness for these results, but at least they indicate the doubtful validity of determining a preponderance of auditory imagery from indications of articulation.

The article concludes with two appendices, one defending the autobiographical evidence of one of the calculators against the attacks made on it by Scripture and Binet, the other containing a carefully constructed table of the principal prodigies, indicating facts relative to heredity, development, education, mental calculation, memory, etc.

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*L'acquisition des habitudes chez les animaux.* GEORGES BOHN.

Année psychologique, 1907, XIII., 170-206.

Bohn considers the ability to acquire new habits the measure of the mental life of animals. His experiments, which were similar to those performed a few years ago by Yerkes, Thorndike, and Kinnaman, indicate that animals carry the memory of successful movements from one situation to another. They manifestly tried to repeat the movements which led to the desired result.

The animals with which Bohn experimented, like those tested in the earlier investigations, gradually learned to eliminate useless acts and to repeat the successful ones until finally they settled upon those essential to the accomplishment of that for which they were striving. Bohn cites numerous experiments upon cold blooded vertebrates, anthropodes, worms, mollusks, and protozoans. He found that the green frog profited slowly from experience, as is the case with the majority of cold blooded vertebrates, chiefly because of their tenacious instincts and individual habits.

As the result of these experiments, Bohn concludes that the mechanism for the acquisition of habits among animals low in the scale does not differ greatly from that which governs the acquisition of habits among those which are higher.

If the ability to profit from experience be the criterion of intelligence, the dog according to Bohn is more intelligent than the cat, since it learned to eliminate useless movements more quickly and was more clever in making short cuts. It is possible, however, that this was due to individual rather than specific differences. After the cat had learned to react to the sentence, "I am going to feed my cat," it required eighty additional days to learn to distinguish between that statement and its negative, "I am not going to feed my cat."

Bohn's monkeys, like Kinnaman's, learned to associate the shapes

of vessels with the food which they contained. After each trial the position of the vessels was changed and they were grouped differently. Associations connecting the size of the receptacles with their contents were established with greater difficulty because the monkeys were tempted to choose the largest vessel, as if they thought it ought to contain the greatest quantity of food. All of the experiments showed that movements ill-adapted to success were progressively eliminated, while movements well adapted took place more frequently, and each time with more certainty.

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### EXPERIENCE AND REALITY.

*Pure Experience and Reality.* EVANDER BRADLEY McGILVARY.

*Philos. Rev.*, 1907, XVI., 266-284.

A tenable system of philosophy must be compatible with scientific facts. The philosophers of pure experience, postulating as they do that the real is the immediately experienced, feel in duty bound to set themselves right with science which deals with realities purporting to exist prior to experience. Professor James reconciles his experiential philosophy with science by tacitly admitting the existence of a genuine reality which is not necessarily experienced. Professor Dewey attempts the reconciliation by allowing the existence of a something 'non-contemporaneously experienced.' But inasmuch as the cornerstone of his system is the theory that the condition of all reality is contemporaneous cognitive experience, this preexperiential something cannot have complete reality. The scientist, however, in his statement of the nature of his objects, asserts their reality, ignoring the experience which conditions that reality; but he does so, Professor Dewey contends, only because he is not concerned with their 'extra-scientific features,' and because the experience factor is so unavoidably there in experience. This contention of Professor Dewey involves a serious confusion. That experience is necessary for the recognition of scientific reality is a fact which the scientist does not ignore. The telescope, for example, testifies to the astronomer's acceptance of this truth. But the preexperiential object of the scientist stands in no need of a *contemporaneous* cognitive experience to make it real, and when Professor Dewey makes this assertion the scientist not only ignores it but rightly treats it as a gross assumption.<sup>1</sup> The object exists

<sup>1</sup> Cf. Professor Dewey's 'Disclaimer,' *Philos. Rev.*, 1907, XVI., 419-422.

as a complete reality, independent of the mutations in any single experience.

An examination of the theory of representative knowledge gives the answer to the question, how can a reality, existing prior to experience, become an object of subsequent experience of it? We have subjective images or ideas which represent previously experienced realities, present realities not immediately experienced, past and future realities which have and have not become objects of our immediate experience. These representative images bear a direct reference to the transsubjective realities, and we come to know the reality through the image.

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### MONISM.

*Les objections au monisme.* F. LE DANTEC. *Revue Philosophique*, LXII., 114-135.

Quoting the statement of one who, in religious matters, had persistently maintained the attitude of a free-thinker yet who had sought to transcend the doctrines of materialism and positivism on the ground that *they were not sufficiently comforting*, the author says that nearly all of the objections to monism spring from analogous considerations. 'They are based on what Ribot calls 'the logic of sentiment.'

The monism which the author supports he first strips of all metaphysical implications. To hold a monistic conception of the world it is not necessary to reduce all phenomena to unity; monism is rather a formula. This formula maintains that nothing transpires which can be recognized by man which does not involve transformations which are susceptible of measurement. 'Susceptibility of measurement' is made the watchword of the monism which the author regards as a recent acquisition of human thought. This monism is not to be identified with the materialism of the ancients.

The dualism to which this monism is opposed is clearly stated by Pasteur, who says that "in each of us there are two men: the man of wisdom, who by observation, experimentation, and reason, hopes to arrive at a knowledge of nature, and the man of tradition, the sensitive man, the man of faith or of doubt, the man of sentiment, the man who does not wish to die but who believes that his essential nature will live on."

This dualism admits the existence of immutable entities that act without being themselves modified and to these immutable entities the

dualists attribute both the direction and the setting in motion of all the activities which are changed into measurable modifications.

The author does not pretend to deny the existence of these immutable entities but leaves the subject to the metaphysicians, holding that on this subject each one can hold the opinion which best pleases him.

The important observation is made that, ordinarily, men are monists or dualists, as the case may be, from temperament or habit and not by reflection or reason. From considerations based upon advancements made in scientific research, however, the monist feels constrained to challenge the position of the dualists who hold that there is a directing entity independent of the corporeal mechanism. For the dualist this independent entity is a necessary presupposition to the doctrine of individual freedom. The monist, however, interprets freedom in terms of the biological relationship of the organism to the environment. From this point of view there is nothing which, to him, can destroy the validity of the monistic formula, that nothing transpires in man which does not produce modifications which are susceptible of measurement.

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#### COLOR VISION.

*Ein Fall von ungewöhnlicher Verschiedenheit der Mischungsgleichungen für beide Augen eines Beobachters.* A. SAMOJLOFF. Zeitschr. f. Sinnesphysiol., 1906, Bd. 41, 367-372.

Professor Samojloff gives a brief report of his own anomalous color perception. The same object, for example a human face, appears more red to one eye and more yellow to the other. A series of experiments was made according to v. Kries's method of equating a mixture of red and green with different homogeneous lights between red and green. The quotient of the red-green mixture for the two eyes was found to vary with the different wave-lengths of the homogeneous light. The inference is made that the anomaly is due to differences in the physiological excitability of the two eyes.

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#### BOOKS RECEIVED FROM MAY 5 TO JULY 5.

*Mind in the Making.* E. J. SWIFT. New York, Scribners, 1908. Pp. viii + 329.

*Elementary Experiments in Psychology.* C. E. SEASHORE. New York, Holt, 1908. Pp. xii + 218.

- Nuova classificazione dei delinquenti.* J. INGEGNIEROS. Milan, Sandron, 1908. Pp. 80.
- Moral Training in the Public Schools.* California Prize Essays. C. E. RUGH and others. Boston, Ginn & Co., 1908. Pp. v + 203.
- L'Education de la femme.* M. C. SCHUYTEN. Bib. biol. et sociol. de la femme, ed. by Toulouse. Paris, Doin, 1908. Pp. xiii + 458. 4 fr.
- La Pellagra.* A. MARIE. Paris, Giard et Brière, 1908. Pp. 252. 4 fr.
- Psychology.* F. ANGELL. 4th ed. New York, Holt, 1908. Pp. xi + 468.
- Die biologische Theorie der Lust und Unlust.* D. C. NÁDEJDE. Heft I. Leipzig, Engelmann, 1908. Pp. 99. M. 2.40.
- Grundzüge der physiologischen Psychologie.* W. WUNDT. 6<sup>te</sup> Auf. Bd. I. Leipzig, Engelmann, 1908. Pp. xvi + 725. M. 13.
- Essays Philosophical and Psychological in Honor of William James.* G. S. FULLERTON and others connected with Columbia University. New York, Longmans, Green & Co., 1908. Pp. viii + 610. \$3.00 net.
- Les inclinations, leur rôle dans la psychologie des sentiments.* G. REVault d'ALLONNES. Paris, Alcan, 1908. Pp. 228. Fr. 3.75.
- Social Psychology.* E. A. ROSS. New York, Macmillan, 1908. Pp. 372.
- Evolutionnisme et Platonisme. Mélanges d'histoire de la philosophie et d'histoire des sciences.* RENÉ BERTHELOT. Paris, Alcan, 1908. Pp. iv + 326. Fr. 5.
- Psychologie des neurasthéniques.* PAUL HARTENBERG. Paris, Alcan, 1908. Pp. 248. Fr. 3.50.
- La synthèse mentale.* GEORGES DWELSHAUVERS. Paris, Alcan, 1908. Pp. 276. Fr. 5.
- L'Année philosophique ; année 1907.* F. PILLON, editor. Paris, Alcan, 1908. Pp. 288.
- On the Witness Stand.* HUGO MÜNSTERBERG. New York, McClure, 1908. Pp. 270. \$1.50 net.
- Religion and Medicine.* ELWOOD WORCESTER, SAMUEL McCOMB, ISADOR H. CORIAT. New York, Moffat, Yard, 1908. Pp. 428. \$1.50 net.

*Hybrid Parts of Speech.* EDWARD G. OWEN. (Repr. fr. Trans. of the Wisconsin Acad. of Sci., XVI., Pt. II.; May, 1908.) Pp. 150.

*The Concept of Control.* SAVILLA ALICE ELKINS. (Arch. of Philos., ed. by F. J. E. Woodbridge, No. 1.) New York, Science Press, 1907. Pp. 40.

## NOTES AND NEWS.

DR. ADOLF MEYER, head of the Pathological Institute of the New York State Commission in Lunacy, has been unanimously appointed professor of psychiatry and director of the psychiatric clinic at the Johns Hopkins University, the appointment to take effect in September, 1909. Mrs. Henry Phipps has recently donated a building with adequate equipment, and has provided for the maintenance of the clinic and chair for ten years.

DR. HARVEY CARR, professor of psychology in the Pratt Institute, will succeed Dr. J. B. Watson (professor-elect in the Johns Hopkins University) as assistant professor of psychology in the University of Chicago. Dr. Carr will have charge of the work in comparative psychology and will share in the conduct of the general experimental course.

DR. CLARENCE S. YOAKUM, of the University of Chicago, has accepted a position as instructor in psychology at the University of Texas.

THE degree of M. A., requiring a bachelor's degree, two years graduate work, and a suitable thesis, has been established at the Johns Hopkins University. It is designed to meet the requirements especially of teachers who enroll in the courses in Education, Psychology, etc., in the University.

DR. H. HEATH BAWDEN, late professor of psychology at the University of Cincinnati, announces a series of four books and four pamphlets on philosophical topics to appear shortly. The larger volumes are entitled *Principles of Pragmatism*, *Principles of Education*, *Principles of Aesthetics*, and *Poems*. The articles now appearing in the PSYCHOLOGICAL REVIEW will form part of Dr. Bawden's volume on aesthetics.

WE have received the first number of *La Revue Psychologique*, a quarterly, edited by J. Joteyko (Brussels, Rossel, 8 fr. a year).

THE following are taken from the press:

AT Harvard University Dr. Robert M. Yerkes has been promoted to be assistant professor of comparative psychology, Mr. D. C. Rogers has been appointed instructor in applied psychology, and Mr. J. H. Woods has been promoted to the rank of assistant professor of philosophy.

WARNER BROWN, Ph.D. (Columbia), assistant in psychology in Columbia University, has been appointed instructor in psychology at the University of California.

PROFESSOR CHARLES H. JUDD, of Yale University, will lecture in the new department of psychology and pedagogy at Chautauqua this summer.

MR. H. B. ALEXANDER has been appointed professor of philosophy at the University of Nebraska.

THE George Washington University (D. C.), has established a separate department of psychology, with Williston S. Hough, Shepherd Ivory Franz, and William Carl Ruediger as teaching force. There will be two laboratories, one for elementary instruction and educational problems, and one for the advanced work of graduate students.

At the Ohio State University Dr. T. H. Haines has been promoted from assistant professor of philosophy to professor of psychology, and Dr. A. E. Davies has been advanced to the rank of professor of philosophy.

DR. CHARLES E. CORY, who has been acting assistant professor of philosophy at Washington University (St. Louis), has been put in charge of the department of philosophy.

## THE

## PSYCHOLOGICAL BULLETIN

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THE PROBLEMS OF MENTAL REACTION-TYPES,  
MENTAL CAUSES AND DISEASES.

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I.

The inevitable question as to the causal position of psychogenic complexes is at last faced by the two most valiant defendants of Freud's conceptions in the domain of dementia præcox.<sup>1</sup> Many critics seem to have misquoted Jung. E. Meyer's comments in his remarks on Jung's book (*Arch. für Psychiat. u. Nervenkr.*, XLIII., 1312-1315), seem to have forced the issue with Bleuler.

In my discussion of the relations of emotional and intellectual functions in paranoia and in obsessions (*PSYCHOL. BULL.*, Vol. III., p. 262), I pointed out that Bleuler refuses to accept dynamic principles in psychology, in the face of his most suggestive conception of affectivity. The same attitude is maintained by him in this article, while Jung is decidedly tending in a frankly dynamic direction. Bleuler's argument shows up the whole apparatus of reasoning which restrains the natural instincts with what seems to me a dogmatic strait-jacket.

Bleuler's thesis is: The complex (in the sense of an emotionally active experience or reminiscence or idea), is not the cause of the disease, but it is the cause of its symptoms or of its becoming manifest. Bleuler "distinguishes strictly between the physical disease and the symptoms. The latter are almost altogether in the mental sphere in dementia præcox. Their totality constitutes the phenomenology of dementia præcox. The real disease or disease-process is still wholly

<sup>1</sup> 'Komplexe und Krankheitsursachen bei Dementia præcox,' von Prof. E. Bleuler und Privatdozent C. G. Jung, *Zentralbl. f. Nervenkr. u. Psychiat.*, N. F., XIX., 220-222.

unknown. It may be an anatomical brain disease or an auto-intoxication or an infection or anything whatsoever; and according to our assumptions we might make different hypotheses as to the causes; but that is none of our concern here. Observations seem to have demonstrated to us that the disease proper, even if considerably advanced, need not produce any of the symptoms usually considered. Physical processes of the brain can never have as corresponding phenomena the prominent symptoms of dementia *præcox*, such as delusions, blockings, hallucinations of words, sentences, and shapes (*Gestalten*), and negativism; but only diffuse phenomena, such as *general* inhibition of thought, *general*—as yet unknown—disorders of intellectual elementary functions, melancholic and manic moods, subjective noises, photasmata. The *secondary* symptoms which usually come to the front must be determined by an additional (psychic) cause. If this cause is absent, the real existing disease may remain latent. The symptoms become manifest when, for instance, a complex of emotional weight begins to act. In the abnormally functioning psyche certain consequences of affects go much further than in the normal; but they are not different in principle. Fragility of the bones is, as such, a disease devoid of symptoms. It only gets symptoms when a trauma acts; only then it becomes manifest. The trauma has qualitatively the same effect as in normal conditions, but quantitatively very different ones. The same relation obtains in dementia *præcox*."

Putting it somewhat differently, Bleuler asserts that what we see in dementia *præcox* should be considered as the 'secondary symptoms' depending on definite psychic mechanism determining only the 'content' of the symptoms. This determination depends on 'complexes.' "No woman who has not either a longing for children or fear of pregnancy, will imagine herself to be pregnant and have the corresponding hallucinations." "A delusion, a hallucination, is hardly conceivable without content, nor is blocking conceivable except at a definite point, and that necessitates a mental cause or determination." "Moreover, we see that the disease becomes often manifest, or relapses or improvements occur, under external circumstances which would also have affective weight in the normal. Hence we are justified in concluding that the complex determines the symptoms themselves and not only the content. The complex is not only the cause of the content of the hallucination of gravidity, but also the necessary cause of the occurrence of the hallucination. Since nobody is devoid of complexes, the disease process always finds them available, and any exacerbation will favor their harmful work." A mere exacerbation of the disease-

process can then probably also precipitate an exacerbation without co-operation of a complex, just as fragility of the bones can reach such a degree that the bones give out without trauma, merely under such ordinary functions as walking and breathing. As the predisposing foundation becomes greater, the Gelegenheitsursache (the complex required) may be much slighter and still produce symptoms.

Bleuler does not define what his 'primary symptoms' are, and it is therefore impossible to consider the justification of this logical manœuvre. The main reason for his division into symptoms produced by the disease itself and secondary symptoms due to complexes seems to be that "certain symptoms of acute attacks, such as the manifestation of catatonic 'Benommenheit' and the far-reaching dissociation in catatonic and amentia-like excitements, cannot be readily explained psycho-genetically so far."

This peculiar dualism of events affects also the concept of 'disposition.' We should distinguish the 'primary disposition' for the disease itself and the 'secondary disposition' for definite manifestations. In this sense it depends on a disposition to infection with typhoid bacilli whether a person will get typhoid ulcers or not; but even if typhoid ulcers are established there still may be a special 'disposition for hemorrhages.'

This shows clearly that Bleuler, like the Kraepelinian nosology, makes such diseases as typhoid fever and general paralysis the obligatory paradigmata of the nosology of dementia præcox. He feels sure that by far the majority of the cases of dementia præcox belong to but one or at the most very few genuine disease-processes, just as the real nucleus of the cases 'which until lately were called general paralysis,' depends necessarily upon metasyphilis. A small rest (of merely *similar* states), as in 'general paralysis,' may be formed by totally different diseases. Further: "Perhaps we must not only consider disease-processes, but also *morbid dispositions* which might account for the symptoms without any new disease-process." This is the crucial alternative, which we might put as follows: Is not the rôle played by syphilis and metasyphilis in general paralysis played by 'psychological disposition' in dementia præcox? Bleuler claims that in the cases of 'general paralysis' 'which do not belong to metasyphilis,' we also find a different course and an anatomically different brain-disorder; this proves the fundamental difference. But even in that morphologically well-determined field, it is not so easy in practice to mark the distinction as Bleuler seems to assume, since there are cases of transition between syphilis and metasyphilis in which we cannot make

a final and absolutely conclusive decision anatomically, so that we must either become dogmatic or admit that the logic of facts is not as clean-cut and unequivocal as the man-made logic of hypothesis. On the other hand he admits that, in some cases, a mere *disposition* of some sort makes it possible for the complex-phenomena to develop, but then they do not by themselves lead to a special disease, to the symptom-picture of genuine dementia *præcox*. These cases therefore are not dementia *præcox*. We might, however, ask why should we draw the line as long as Bleuler admits that the 'physical disease' and the primary symptoms are unknown? Would it not be wise to try the facts at hand before we resort to the unknown as the real 'Ding an sich' and a possibly unnecessary division?

E. Meyer had incriminated Jung with a modern revival of the preference of psychic causes in the etiology of mental disease. Bleuler is afraid of any such heresy and bluntly claims that Jung's work (see PSYCH. BULL., Vol. IV., p. 196) did not deal with etiology. Bleuler emphatically declares that Jung's affective toxines are merely a collateral hypothesis and not even accepted as such by him. In 'real dementia *præcox*' there is a "real auto-intoxication from internal secretions (Kraepelin), not mentally determined, or an infection (Bruce), or a glia proliferation or whatever it may be" a real physical disease back of it all. The complexes do not in any way determine the disease, but they determine in some ways the greater part of the symptomatology. Bleuler assures us that we also shall find primary symptoms of the real disease and of its exacerbations. Meyer saves the anti-psychogenic dogma with the statement that the complexes govern the thought not because they are the cause of the disease but because the disease allows them to come to the front 'uncorrected.' Bleuler admits that, but not without adding that the word 'un-corrected' does not make the whole difference between the effects of complexes in the patient and in the healthy. Bleuler also feels obliged to decline being on the same ground as Gross, who had described 'complex phenomena' in a case of manic-depressive insanity. The case 'belongs to dementia *præcox*!'

Jung feels obliged to make an additional summing up; he agrees with Bleuler on the following points:

1. The symptomatology of dementia *præcox* is to a large extent determined by complexes as to its contents.
2. Acute attacks, exacerbations, aggravations, remissions, etc., have extremely often psychological causes which become efficient on ground of the brain-disposition peculiar to dementia *præcox*.

He differs from Bleuler on the following points :

1. He leaves open the question as to what the preparation of the brain peculiar to dementia consists in, whether it is already the 'latent disease' or not.
2. He does not know whether there exist any primary mental symptoms devoid of ideogeneity or psychogenetic cause.
3. With Bleuler he does not doubt that the disposition to dementia *præcox* can be developed into the organic disease-process on ground of *non-psychological causes*, but he doubts whether this is so in all cases or forms of dementia *præcox*.

In other words, Jung now explicitly takes the attitude that the complex not only determines 'the content' of the abnormal developments and the secondary symptoms, but that it can have a rôle in the origination of the organic disease-process.

This rather full recapitulation touches the very foundations of psychopathology. Bleuler keeps aloof, but Jung tends to yield to the inevitable consequences of the facts as sketched in my comments on Jung's 'Psychologie der Dementia *præcox*' (PSYCHOL. BULL., Vol. IV., p. 196), and in my interpretation of dementia *præcox* (*British Med. Journal*, Sept. 29, 1906) as most probably essentially the product of conflicts of instincts and habits, including the reaction to 'complexes.'

The whole discussion will surprise any one who is not under the peculiarly powerful spell of the term 'disease' and ready with the dialectic apparatus which is used to disarm the claims of actual 'mental causation.' What can it all mean?

The great contribution of Bleuler and Jung to psychopathology is the splendid material they have furnished towards a deepening of the conviction that many abnormal mental developments are best understood along the lines of reactions to affective experiences, *i. e.*, principles which also govern our normal mental life. Bleuler's 'Affektivität, Suggestibilität, Paranoia' (see PSYCHOL. BULL., Vol. III., p. 259) is full of the most valuable data for a psychogenic interpretation of paranoic states. Jung's work on dementia *præcox* shows further that even such a strange alteration of mental activity as that presented by many phases of the process of mental dilapidation yields readily to an analysis similar to that of hysterical events. The bulk of the facts is in harmony with a psychogenic explanation not only of psychastenia and hysteria but of a broad range of mental disorders. Only for the deterioration, Jung was tempted to appeal to a production of toxines, and Bleuler's medical conscience forces him one step further.

back: to the 'disease,' that fetish which physicians see back of the phenomena, and which at times relieves them of the burden of getting dynamic clearness into the events. It is also the one hope and pièce de résistance in the desperate struggle for the maintenance of psycho-physical parallelism. The secondary symptoms, the passing show of plain mental reactions, may have their laws of association and in a way a system of causal connections, so that it is correct to speak of ideogeneity or psychogenic developments. But out-and-out causation, especially causation of lasting deterioration such as must have some foundation in lesions which cannot escape microscopic demonstration much longer—that demands a 'disease' back of the symptoms or facts. It is wholly unknown, but it 'must be' one or at the most but a few kinds of processes; we do not know its direct symptoms but only the secondary symptoms, and these are mental.

Wernicke consoled himself concerning the *noli me tangere* of mental causes by speaking of the excessive 'Causalitätsbedürfniss' of man. Why these efforts? Simply owing to the hesitancy about a revision of some fundamental tenets discussed in connection with the philosophical testament of Möbius on the hopelessness of all psychology (*PSYCHOL. BULL.*, IV., 170-179) and a residual of scholastic faith in noumena and in lesions, however uncorrelated, in the field of nosology.

## II.

Odd as it may seem, psychopathology has produced most fruitless debates over two of its favorite issues: The desire to understand the peculiar reaction of mind as signs of irritation or other lesions of its organ, and the effort to use in a dogmatic way the medical formula of specific diseases.

Both of these tendencies are legitimate and fruitful enough in their sphere, but outside of it they become a distracting and misleading rut, away from the line of sanest development.

To counteract this I have made use of the term substitutive activity for a group which it is unprofitable to discuss from a neurological view-point, and I have tried to divest the notion of diagnosis and disease of its dogmatic noumenal characteristics.

First, the foundation for the term substitutive activity.

Psychopathology has been somewhat misled by traditional psychology to a premature stabilization concerning an issue which is relatively unessential except for systematic analysis: the problem of elements of mental life with its inherent hankering for the *Ding an sich*. Most psychatries make us believe that morbid mental activity is mor-

bid owing to the introduction of absolutely abnormal additional elements, and they enumerate them as hallucinations, delusions, melancholia and mania, obsessions, etc. With these supposedly *specific* products of 'disease' the psychopathologist proceeded to apply the venerable formula 'ubi est morbus,' and it utilized the systematized inferences of neurology, until finally the dogma arose that what we call mental in daily life could not be scientific unless it was translated into a form of meta-neurology — a systematization of neurological inferences, usually least supported by those who have a first-hand knowledge of the brain and its lesions. The result was that psychopathological inquiry rested its case on an archaic method which clings to it even where the modern developmental and relational formula of knowledge and inquiry with its three dimensions and obligatory time-component, viz., the formula of experiment, has superseded the static, geometrical schemes which telescoped the natural events if possible into one plane devoid of time-component, thus playing with dynamic principles to the extent of making even biologically thinking men content with the parallelistic theory. The consequence of the noumenal attitude, the attitude that hunted for the Ding an sich, the element and if possible its 'lesion,' instead of the events in terms of experiment, is that the events which should occupy us are not studied as experiments of nature, on the ground on which they are *accessible*, but on the ground of a system of assumptions which forms a pseudo-scientific tautology, just as the morality of the past had to rest on a religious-moral construction rather than on the plain socio-logical and individual needs. Most of what is offered as neurological explanations of mental processes and especially abnormal mental processes is a tendencial precipitation of a mixture of truisms and assumptions into the terminology of a field in which there is to-day no possibility of bringing the conclusions to a test. It is neurologizing tautology of what had better be expressed as we experience it: biological reactions of the mental type.

Neurology certainly has its field, and is one of our most valuable controls, but why should we surrender to it the wholesome pluralism of practical life when we work in psychopathology?

To reduce the facts and events of this world to a system in which they can stand word by word as peacefully coexistent, as in an encyclopædia, with elimination of the time-component and with a towering logic of noumena, was the luring dream of an earlier stage of knowledge. To see things as participants of *events*, to reduce the complex *events* to simpler *events*, but still events with a time-compo-

nent, is the modern logic of science and also the leading feature of biological psychiatry, and we favor it especially because its schemes give us space to note essential factors and components of our observations and logic of events which were too hastily crushed out in the telescoping process copied from the logic of words.

To describe events, biological or non-biological, we record the starting points or conditions of the outset, then the developments, and the final result and resting point. We are satisfied with the correctness of the picture and the implied interpretation, if the various steps are in harmony with *fundamental experiments* or thoroughly tested and standardized events, and if we find that the experience with principles of modifications of the experiment allow us correctly to foretell the modification of the *results*.

This practical attitude allows us to take account of all the corollaries concerning the material which enter into the events. The psychological observations *must tally* with the laws of neurology, or if they do not there is cause for a danger-signal. Since, however, not every psychologist is a neuro-histologist, we should encourage all methods which keep the observer on the ground on which he has a fund of experience, the observer of mental life, behavior and conduct on the *ground* of mental life (in the sense of biological adaptation of the type of behavior and conduct), and the neurologist on the ground of neurological experiments, but last of all things should we encourage the hasty translation of *events* into inferential schemes of *structure*, the psychological histology and the histopathological psychopathology. I have too much respect for the spheres of histology and study of behavior, with their respective laws of propriety and rules of test and control, to encourage the hybridization which does not usually favor high standards in the outcome.

We therefore see in *psychopathology the study of abnormal behavior and of the modifiability of its determining factors*. To use a slang phrase: we study what is doing, and the safest final test we can introduce, better than that of any ready-made and plausible nerve-cell scheme, is the question: how does the result of an analysis influence the observer's *action* in the shaping of events or in formulating the experiment of nature? The most essential achievement is not the erection of a word-palace of logic or of description, but the enlargement of our command of action, however modest.

Creation of comparative standards with the same denominators, and measurement of the achievements by their influence on our action in further analysis or in fruitful modification of the experiment, is the ideal which I should like to make for.

For a long time physicians had to discourage attempts to explain abnormal conduct along the lines of what we experience with the supposedly normal. In the first place, this averse attitude was most urgently demanded by medicine, as long as human conduct was too exclusively sized up according to moral schemes to be looked at in a fair matter of fact manner. Abnormal mental reactions were met with the schemes of moral training and punishment on a doctrine of sin, even when rating the situation as sinfulness was glaringly a grave transgression of justice. The physician further sees that under the guidance of ordinary untrained every-day practical psychology abnormal conditions are often not satisfactorily influenced, and he settled into the non-committal régime of procuring rest and protection and physical improvement; and since there was no inducement to look for the possibly helpful, though less obvious, psychological determining factors, he satisfied the instinctive impulse for explanations in a chase for the histological noumenon, that is, the 'real' morbid cause, encouraged by the dogma that mind is anyhow either an epiphenomenon or an independent essence, outside of the sphere of the physician.

As we study anomalies of mental activity and conduct we find some plainly due to extra-psychological events, for instance, happenings in the brain, such as vascular occlusions with consequent softenings or inflammatory processes, or simple senile atrophy, or intoxications; that is, conditions which in their etiology, evolution and outcome are clinched in terms of physiology and pathology of the nutrition and vascular apparatus of the brain. There are, however, other disorders in which the circulatory and nutritional facts are merely incidental, and which we find best expressed in terms of mental events or reactions and their consequences. As such I should mention the results of emotional shock or of emotional fretting, or of continued uncorrected and unchecked false reasoning. Since in these conditions certain infra-psychic biological relations are frequently found to be at fault as well, through incidental loss of sleep, and malnutrition, etc., the physician is inclined to over-rate them in his psychophobia and, finally, to *assume* these sub-cerebral conditions as the noumenal or 'real' cause, even where he does not *find* them or has nothing whatever to work on.

In the face of these tendencies and especially in connection with the study of hysteria and psychasthenia, it has become possible to demonstrate chains of mental happenings which tend to fulfill all the conditions of an experiment, *i. e.*, to single out the initial factors, to

show their natural elaboration and the development of the inevitable result; moreover, it has become possible to show how successful treatment depends on definite laws of modifiability of these factors.

One of the first things that have proved of value in this direction has been the abandonment of fussing over the supposed *elements* of psychology and the attempts to explain the chains of events out of such elements. It proved to be much more satisfactory to speak in terms of situation, reaction and final adjustment and to describe all the facts of interaction according to their weight without excessive scruples over the systematization of what will be the last thing to reach a stage of more than logical certainty. It is better to use the broad concepts of instincts, habits, interests and specific experiences and capacities, than the concepts of structural analysis at the present stage of our biological knowledge.

Some of the reactions are so closely akin to what we experience in normal life that they do not create any difficulty. An excessive depression, leading to a suicidal attempt and a profound alteration of the whole biological attitude, presents a plausible chain of evolution, and is apt to tell us all that we can act upon in the case. But how about the hysterical developments, or psychasthenia with its strange ruminations and tantrums, or the odd reactions in delusional states where the patient becomes apparently incomprehensible? In all these conditions somatic explanations have been tried; hallucinations have been described and explained, as the outcome of peripheral irritation with resulting secondary sensations, or hallucinations and delusions have been described as sejunction of nerve mechanisms. Visceral anæsthesias and paræsthesias have been appealed to, without in the main achieving more than paraphrasing the conditions or broadening the field from which valuable explanations can be taken, which helped in relaxing the one-sided dogma of exclusive salvation in anatomy sufficiently that some investigators again see practical advantages in working along functional and experimental lines.

As soon as we make the reactions appear as part of an adjustment, a response to a demand, the issue of our investigation becomes infinitely more practical and nearer to what we really can handle. Steering clear of useless puzzles liberates a mass of new energy. When we come to such waves of events as sleep, or many of the more strictly mental reactions such as emotions, and still more, the complex compound reactions, such as a day's work, we *cannot* get along with a bulky inventory of a body of a definite number and arrangement of cells and interaction with outside stimuli grouped according to these

cell-units of our scheme and the elements of structural psychology, but must accept higher units, reaction-curves, reaction-types, and without dropping back into a faculty psychology we are forced to admit as practical the characterization of reactions as part of *an adjustment, a response to a demand*.

What recommends this concept as a preliminary summary formula is its close adaptation to the *fundamental* formula of systematized experience, the experiment. The reactions are put down as experiments, as adjustments of a situation. This puts us on the track of the facts without our altering them to non-recognition and putting them into a narrowing strait-jacket of traditional assumptions. The excessive fear of the personal equation is ridiculous. The first step has always been keen observation of some real events or real possibilities, and the *analysis* of the means is a secondary process. Newton's apple-story and the steaming pot of Watts are anecdotes in point, perhaps not historically true but illustrative of what happened. In the concrete things we surrender more quickly our defects of observation and judgment than in the routine of traditional systems which create anomalous settings not easily checked. The theorizing is an inevitable evidence of the type of mind that can discover things, but the discoveries lie in a keen grasp on actual events and sensitiveness to new facts.

Within this study of adjustments, the concept of substitutive reactions is meant to keep us from wandering from the ground of the experimental formula of investigation. To try and explain a hysterical fit or a delusion system out of hypothetical cell alterations which we cannot reach or prove is at the present stage of histophysiology a gratuitous performance. To realize that such a reaction is *a faulty response or substitution of an insufficient or protective or evasive or mutilated attempt at adjustment* opens ways of inquiry in the direction of modifiable determining factors and all of a sudden we find ourselves in a live field, in harmony with our instincts of action, of prevention, of modification, and of an understanding, doing justice to a desire for directness instead of neurologizing tautology.

The conditions which we meet in psychopathology are more or less abnormal reaction-types, which we want to learn to distinguish from one another, trace to the situation or conditions under which they arise and study for their modifiability. For this reason I teach the students to start essentially from six types of disorders or reaction-types:

1. The reactions of organic disorders :

(a) Types which can be reduced to the symptom-pictures of asymbolia (mind-blindness and mind-deafness), apraxia and aphasia, and the symptoms of callosal lesions.

(b) Reactions, on ground of focal or diffuse affections, in the form of epileptoid responses, actual motor fits, or psychic epilepsy, or less defined states of bewilderment of dazed activity, wandering, or acts of violence, usually with subsequent amnesia; or states of diffuse memory-defects and defective judgment — (a) Korsakoff's complex: very deficient retention, relatively clear grasp of what is in sight, but hopeless time disorientation and fabrications; (b) general paralysis: especially marked discrepancies in dates and calculations, change of sensitiveness and judgment, and extravagant notions; and (c) senile reaction: defective memory, retention and orientation; tendency to live in reminiscences, often with occupation-delirium.

2. Delirious states with dream-like imaginative experiences, hallucinations, especially of sight, or especially of hearing, fleeting or more systematized under a leading effect (fear, suspicion), with deficient grasp and orientation; reaction in direct intoxication (hasheesh, belladonna), or fever or exhaustion, or prolonged exhaustive, toxic or infective influences. The exogenous (toxic-exhaustive) and organically determined forms usually show certain *physical* marks of their own; the endogenous or psychogenic types (hysterical or epileptic delirium or other psychogenic tantrums) are usually marked by stigmata of their own (hysterical or epileptoid marks and setting), and traceable to substitutive reaction-types.

3. The essentially affective reactions: the manic-depressive reaction types are marked by oscillations in the direction of feeling of well-being and exaltation and tendency to flight of ideas and activity, or in the direction of feeling of difficulty, retardation or real inhibition, and sadness, down-heartedness, or mixtures of these elements; the anxiety type follows rather the series nervousness — uneasiness — anxiety; the simple depressions are, more or less, excesses of normal depression.

4. Paranoic developments — with formally correct conduct and grasp, but inability to adapt the personal trend of thought and elaborations and attitude to the facts. We thus see the following grades of developments:

(a) Feeling of uneasiness, tendency to brooding, rumination and sensitiveness, with inability to correct the notions and to make concessions — paranoic constitution and paranoic moods.

(b) Appearance of dominant notions, suspicions or ill-balanced aims.

- (c) False interpretations with self-reference and tendency to systematization, without or with —
  - (d) Retrospective or hallucinatory falsifications, etc.
  - (e) Megalomanic developments, or deterioration, or intercurrent of acute episodes.
  - (f) At any period antisocial and dangerous reactions may result from the lack of adaptability and excessive assertion of the side-tracked personality. Paranoic developments occur wherever assertion of the personality on logical grounds and reasoning occurs on false premises with inadequate realization of need of correction — hence the occurrence of incidental paranoid episodes, and the paranoid character of 'recovery without insight.'

5. Substitutive disorders of the type of hysteria (submersion of the disturbing experience or issue, and conversion of the reaction into the hysterical manifestations, as a rule with amnesic mechanism), and psychasthenia (ruminations leading to states of tension and panic, and substitution of phobias, of obsessions, and incomplete reactions generally).

6. Types of defect and deterioration: existence or development of fundamental discrepancies between thought and reaction, defect of interest and affectivity with odd reactions; dreamy fantastic (crazy), or hysteroid or psychasthenoid reaction, with a feeling of being forced, of peculiar unnatural interference with thought, etc., frequently with paranoid, catatonic or scattered tantrums.

These conditions are not to be taken as 'diagnoses' but as reaction-types: The first two with prominence of somatic conditions; the third and in part the fourth anomalous developments of individual reactions, partly dependent chiefly on the make-up (the genuine manic-depressive and paranoic reactions), and partly dependent more especially on general situations (such as many anxiety states, and simple depressions). The fifth and the sixth group are less overt and direct excesses of response, than direct faulty substitutions of variously conditioned modes of evasion, untimely evolution of instincts, etc. In every anomalous mental constellation we ascertain: (1) The infrapsychic components (general somatic disorders or effects of disorders of special organs including the nutritional and coarsely histological disturbances of the nervous system); (2) the components which are fully sized up only with psychological conceptions, either overt and direct miscarriage, or substitution.

With such a subdivision the student is at once put on a practical basis which is suggestive in the main directions of discrimination and

action in terms of the accessible facts. He is expected to describe each case with a view to the situation and personal factors and to discriminate between anomalous reactions which point essentially to infra-psychic disorders and others chiefly *excessive* responses of individual reaction, and still others which are provisionally best described as substitutive reactions, *usurping* the place of what is wanted to really meet the constellation and suggesting an inquiry into what determines the substitution (the hysterical or psychasthenic or other reactive habits with or without circumscribed 'complexes').

It is obvious that with such an arrangement of our data we break with the sham problems of psychophysical parallelism and much of what constitutes traditional psychology. Structural psychology has its place in psychopathology as a help in the discriminative and analytical problem of identification of events; but dynamic conceptions must constitute the problem proper. In order to be dynamic, the 'mental reactions' are taken as complete phases of adaptation, or conduct and behavior, including both the 'physical' and the 'mental' aspect, as reactions of adjustment of the person as a whole in contrast to the non-mental reactions or activities of the special somatic organs. The *mental* reactions are necessarily physical, but contrasted with the *non-mental* reactions, and distinguished by the qualitative feature of consciousness in the modes of their hanging together. They are the *attitudes and reactions of the person as a whole*. They have their anabolic and catabolic aspects. Their temporary constellation determines the start and execution of any new reactions; they may make for smoothness in the reactions *or* interfere both in the proper hanging together and flow of adjustments *and* in the anabolic and catabolic balance. Disorders may prevail in either direction, in the adaptation of the stream of activity to mental or functional balance, and in that of the nutritional issue, according to definite laws of incompatibility. But the function and its disorder *may* be the only accessible material to work with. Jung speaks of the effects of complexes and claims the production of toxines, while I insist more on the interference with smooth and adequate habit-reactions and responses with possibilities of anabolic and catabolic disturbances. Why then should we have to insist so on the 'physical disease,' if it is a mere formula of some vague obstacles, while the functional difficulties give a plain and controllable set of facts to work with?

It is deplorable that what can at the best be only a temporary help and scheme to give the facts of a complex disorder like dementia praecox a suggestive and helpful order, should be given as rigid and

dogmatic a position by physicians as that which figures definitely as a disease. The 'disease' is a formula which becomes vague and distracting unless it sums up some essential facts or embodies some workable heuristic principles. The notion of *disease* or *disease-entities* is hardly ever conspicuous where it is easy to maintain the entity. Fractures and contusions are so plain that we need no noumena back of them; in infectious diseases the formula is equally plain: An organism with a certain susceptibility to a definite form of infection reacts in a definite manner. A large complex of 'diseases' consists of insufficiency or poor adaptation of function to demand, in other words, disorders of regulation. As soon as these disorders entail deficient repair of progressive structural alterations in any given part of the mechanism, that feature is apt to be singled out as the 'disease,' or as the medical slang has it, 'the pathology.' The 'disease' is the noumenon for certain expectations about combinations of manifestations. If the term is to have any value it turns on some facts which may be superficial or recondite, but which must mark points of central interest. In their contrast between hysteria and dementia præcox Bleuler and Jung appeal to the difference of the 'disease.' What constitutes a disease-unit, is either merely a reaction-type, or it is a reaction-type under special etiology and special evolution and outcome, or it is possible to single out a definite item of events (infection or intoxication or even a simple rough injury or a lesion). But in these days in which the experimental interpretation has become so much superior to the old-fashioned way of telescoping events into the concept of a 'lesion,' we cannot afford any longer to ignore the chains of conduct and behavior or mental reactions, as they may give the safest and most sufficient presentation of the facts in a disorder.

The maintenance of the disease-concept has a great advantage for orderly thinking, but like the neo-vitalistic modes of presentation of biological facts, it would be most detrimental if it should be considered as more than a formula of available facts or a starting point of more fundamental work. Under all circumstances we must beware, however, of any *a priori* definitions which might rule out strings of facts because they are 'mental.'

### III.

As soon as we put ourselves on a dynamic psycho-biological foundation, we make unnecessary the continual yearning for something back of the events, at the expense of the plain facts in evidence. The whole movement of modern thought is one of

distrust of the noumena back of things and rather favors a valuation of what is at hand in just the form in which we have to handle it. But medical discussion finds it difficult to outgrow the old habit. A charming instance deserves to be quoted from a discussion of a report of Jung on Freud's theories (*Corresp.-bl. für Schweizerärzte*, 1908, p. 219). Kesselring starts with the remark that with all the theories of Freud the essence of hysteria could not be established. The 'essence' is the residual of the craving for 'first principles,' the aim of the formal dialectic 'Causalitätsbedürfniss.' Knowledge and words do not aim to become a complete duplication of the concrete facts and events, but they aim merely to be *sufficient* for the purposes of a system of action or analysis. After this demand for still more fundamental explanation, Kesselring first rehearses the frequently repeated notion that only the layman sees anything in the contents and connections of delusions, whereas they should appear irrelevant to the physician who looks rather for the excitement, the inhibition and the general fact of delusion-formation, as the typical issue of the 'disease-picture.' These are the primary symptoms in contrast to the secondary layer. He derides the possibility of abnormal experiences having any influence on the disorder. The form is irrelevant. But as soon as the matter helps his cause, he turns around and claims: "There are also cases which demonstrate directly the harmfulness of the treatment with Freud's psychoanalysis, e. g., a girl who had neurasthenic troubles following a sexual indiscretion, then was psychoanalyzed and thereupon passed into a chronic depression in which the thought that other persons knew of her lapse played the main rôle." Here Kesselring is ready to use the legitimate causal principle; why not before? Freud himself would be the last person to claim that his information and method were the last word; and those of us who follow up principles rather less exclusive than Freud's, viz., the habit-disorganizations and the study of conflicts and their effects and their modifiability (see the excellent summary by Dr. A. Hoch, PSYCHOL. BULL., IV., p. 161), would certainly not claim that they make further study unnecessary. On the contrary. Here is a new problem. Here begins a new set of work. No one-sidedness; no slighting of brain-histology, or of biochemistry, or of general and special pathology of the parts outside of the brain — but an assertion of plain sense to start with. The habit of analyzing facts in terms of dynamic psychology and the more careful detail-study of clinical analysis give us a safe ground of plain facts on which the details of claims about indican, the importance of a tear in the perineum or cervix, or of an error of

refraction of the eyes gets its dues, and on which we shall see that none of the biological advances of medicine shall be neglected. On the other hand, if we see that certain mental experiences aggravate conditions and precipitate new attacks or determine an improvement, we might well derive from this some courage at least to consider the possibility that the mental factors or reactions *may* really constitute the essential element in certain disease-conditions and that it is only distracting to speak of a 'physical disease,' wholly unknown in 'merely physical' terms, where the facts are so plain, and so easily understood — or slighted.

## PSYCHOLOGICAL LITERATURE.

### PSYCHOPATHOLOGY.

*Zur Analyse psychotraumatischer Symptome.* BEZZOLA. Jour. f. Psychologie u. Neurologie, 1907, VIII., 204-219.

The author discusses the difficulties and drawbacks found in analyzing cases according to Freud's method.

In the first place the preliminary hypnosis is not always applicable nor is it necessary. Difficulty is encountered particularly in anxious states or where the psychic trauma has been acquired during sleep (dreams). Some patients in spite of their willingness cannot be brought into a hypnotic state.

Also the other method recommended by Freud in which the patient is told to concentrate on a definite topic and then to relate whatever thoughts come into his mind, does not in many cases yield any result, or truth and fancy are hopelessly interwoven and even the physician with a strong imagination cannot establish any subconscious complex. The mental pictures which appear in consciousness may be more ambiguous and difficult to interpret than the dreams and symptoms already manifested by the patient.

The greatest drawback to Freud's method, however, is the danger of suggestion to the patient through the attempts of the physician to interpret and explain. In view of all these difficulties B. attempted a modification of Freud's method so that the original upsetting occurrence could be exposed, 'lived over' and united to consciousness not through analysis and interpretation of secondary manifestations but through a synthesis based on the primary perception.

Wernicke's doctrine of hallucinations led the author to seek in his analysis not for complexes but for primary sensations out of which the traumatic experience was composed. The lack of complete association (secondary identification) at the moment of the trauma, due to a contraction of the field of consciousness, leads to patches of amnesia and false interpretation of the conscious components. In psycho-synthesis the criticism of the ego is excluded and the individual conscious elements become strengthened through rehearsal of the former experience; at the same time the unconscious associated components are re-

called and finally the entire occurrence becomes conscious and the psycho-traumatic symptoms disappear.

The author outlines his technic as follows: A careful anamnesis is taken and an association test made. The patient is allowed to recline on a sofa in a slightly darkened room, eyes closed. He is then told to try and suppress all of his thoughts — to think of nothing, but to pay attention to any visual images, local sensations, general feelings, noises, odors or tastes which he may perceive, and to relate immediately his experiences without giving any thought as to the origin. One needs to ask, therefore, only a few simple questions — viz., What do you feel? What do you see? What do you hear? etc. The physician observes closely the expression and demeanor of the patient. Often a scene is at once described or a characteristic sensation felt; the patient may execute various movements, exhibit tremors, anxiety changes of facial expression, etc. The patient may remain entirely clear throughout the sitting or show varying degrees of narrowing of consciousness. In this hypnoidal state the patient may talk and act for an hour and then awaken with complete amnesia. After the treatment is begun the patient is also apt to dream in his natural sleep of the primary trauma. After some days an interest in the original upsetting incident appears in the patient's waking states and finally there is full recollection of all the details of the early trauma; the dissociated experience is thus brought completely into consciousness and the nervous manifestations disappear.

The reason for the defective association of the experience (trauma) is found in the suddenness of the insult and dissociation from the brain activity because of shock, sleep, emotion, strong distraction of attention and other conditions which make impossible the immediate association of the experience with consciousness. A number of illustrative cases are reported, some of which are given in the following brief abstracts.

*Case A:* As a child the patient was nervous and sexually precocious, suffered from fatigability and tremulousness, was imaginative and impulsive. Once he shot himself in the arm and claimed that a 'large thin man' had wounded him. He was arrested as an imposter. Two years later, after a quarrel with some companions, he fell asleep but was awakened by one of his associates who whispered something in his ear. The patient immediately became greatly excited and had a convulsive seizure with loss of consciousness. In a few days fits recurred. The diagnoses made were epilepsy and hystero-epilepsy.

March, 1902, when treatment was begun, the patient was very ex-

citable, changeable in mood, imaginative, self-reproachful, amnesic for the attacks, showed no defect. Hypnosis easily induced by verbal suggestion. Analysis of the situation just before the first convulsion showed that while asleep the patient had dreamed that a girl was shot by a boy and he (patient) was engaged in a deadly combat with the girl's assailant. This account obtained in the hypnotic state, was related under great excitement and display of strong affect—the patient showing that he was again living the dream through. He said that the boy had whispered the following in his ear: "What's the matter? Don't be so crazy. Good night."

The hypnosis was repeated several times and the patient was allowed each time to relate the dream, which he did with diminishing affect and less excitement, until finally he could relate the experience as calmly as if he were merely reading it in a newspaper.

In the hypnotic state he also explained that when he claimed that a 'large thin man' had shot him he had a vision of an uncle by whom he had once been frightened during a game of hide and seek, the uncle appearing suddenly from behind a tree in the woods. The shock at the time had been insignificant but afterwards nervous symptoms appeared.

In hypnosis the patient was given the suggestion that he relate to his parents these various concealed incidents of his life. Acting on this suggestion he told of the hide and seek incident, the shooting episode, and the dream experience, declaring that he had just happened to think of these occurrences. The result of the treatment was that the fits ceased and all the nervous symptoms disappeared and have remained absent now for five years.

*Case B:* A thirty-year old farmer, who since youth suffered from weakness of memory, irritability, insomnia, headaches, dizziness and terrifying dreams about horses. When a boy of twelve he had been thrown out of a wagon by a runaway horse, sustaining a fracture of the skull, was unconscious for a week. The patient had no recollection of the accident; his only knowledge of it was what he had been told.

**Psycho-synthesis:** Upon closure of the eyes the patient described the street where the accident occurred, and with an exacerbation of headache and dizziness he related with exactness all of the particulars of the accident (confirmed by his father). The author appends a stenographic report of the patient's description. Upon opening the eyes at the end of the sitting the patient felt much relieved and recollected all that he had related. Although the treatment was interrupted the patient reported at the end of the year that he was entirely well.

*Case C:* A thirty year old officer has been for some years irritable, unable to work, incapable of concentration. Complains of dizziness, headaches, pain in right arm and leg. He was treated by electricity; drank to excess. Increase of his symptoms after a fall from a horse. He had a hazy recollection that when a boy he fell from a tree.

*Psycho-synthesis:* Hypnosis was not attempted because the patient thought it a foolish procedure and did not believe a cure possible. He was asked to close the eyes and describe the fall from the horse. In describing the accident, at the moment he felt himself falling, he saw himself once more a boy up in a tree with some comrades. He then related all the circumstances of how he fell from the tree and sustained a severe head injury, recalled how the wound was treated and other details. He told of another fall from a horse (about which he had not spoken) which had caused severe pain in the right arm. As a result of the treatment the patient was relieved of all his complaints and gave up drinking entirely.

*Case F:* A young woman suffered from nervousness, insomnia, fear of becoming insane, hyper-sensitiveness to auditory stimuli and constant noises in the ears. Attempts at suicide were made.

The analysis revealed that at the birth of her first child the patient was greatly shocked at finding a nevus on the baby's forehead. After two sleepless nights she fell asleep only to become greatly agitated during a dream. The nurse awakened the patient with difficulty. After this the patient was entirely changed, becoming worse after a second child-birth, and after various operations intended to relieve her nervousness.

*Psycho-synthesis:* The ear noises were found to have originated from rustling of the moire dress of the nurse. The night following the sitting the patient finished in her natural sleep the dream that had been interrupted by the nurse. In this dream the patient found herself in a wood where she plucked whortleberries in order to divert herself from the terror over the birth-mark which she feared was a 'wine-mark.' Entire relief followed the completion of the dream.

A number of other interesting analyses are reported, among which is described the case of a woman who was awakened from her sleep by the death struggle of her husband who was stricken with heart-disease. After this shock the patient was unable to sleep although given all kinds of sedatives as well as hypnotic suggestion. The picture of the husband lying dead was always before her mind and sleep was impossible.

The treatment consisted in allowing the patient to rehearse the entire death scene and after this she actually fell asleep. The insomnia gradually subsided and finally natural sleep was readily induced if the patient merely thought of her deceased husband.

G. H. KIRBY.

## PSYCHOGENETIC FACTORS.

*Ueber die Bedeutung sexueller Jugendtraumen für die Symptomatologie der Dementia praecox.* K. ABRAHAM. Centralbl. f. Nervenkd. u. Psychiat., XXX., 409-415.

According to Freud the symptoms of hysteria are based on reminiscences having a strong emotional value, relating chiefly to sexual experiences which date back to early childhood. Unfulfilled longings and unpleasant occurrences are excluded from consciousness only to persist as subconscious activities which later, under special conditions, emerge as hysterical symptoms. The mental mechanism consists therefore of a process of submergence and later conversion into hysterical symptoms. The investigations of Bleuler and Jung show that analyses of cases of dementia praecox along the same lines yield very interesting results. The symptoms of dementia praecox indicate that the patient uses the same kind of material as the hysterical does, that the sexual life also plays the chief rôle in the development and that a similar mental mechanism exists as in hysteria.

The object of the author's investigation is to see if infantile sexual experiences appear in the symptoms of dementia praecox in a similar manner as they do in hysteria. The case is reported of a woman who was violated at the age of ten by an uncle who threatened to burn down the house if she informed anyone of the seduction. The sexual act was repeated several times and the uncle disappeared. The child, who related nothing of the occurrence, soon began to have sexual feelings similar to those felt in the assaults and she began to masturbate. Then came ideas of reference, she felt that people knew what had occurred, they seemed to avoid her and talked about her. She was depressed, thought much of suicide, had nocturnal visions and saw the barn burning where she was seduced. She had many dreams with a strong sexual coloring and a wish for sexual gratification probably existed. When thirty-seven years old she heard the voice of a 'good uncle' from heaven; he forbade her to commit suicide, told her she would inherit property, marry and have two children. The content of those hallucinations expressed clearly the fulfillment of a wish. Later the patient was swindled out of her meager possessions and following this she became greatly depressed. She heard voices out of hell, this time it was the 'bad uncle' talking and urging her to commit suicide.

In this case it appears that a childhood experience associated with strong affect gave a definite content to the later hallucinations and de-

lusions. It is not claimed that without this sexual trauma the individual would have remained mentally normal. One can only say that the mental symptoms appeared quickly after the sexual trauma. Another case is related to show that the psychosis may develop many years after a childhood trauma.

Freud does not teach as formerly that the hysterical reaction originates out of the early psycho-sexual trauma; he emphasizes as most important an inborn disposition by virtue of which the individual reacts in an abnormal manner to sexual impressions. The author comes to the same conclusion regarding dementia praecox. A number of cases give a history of definite trauma, while others exhibit abnormal sexual traits in childhood without suffering any severe insult. These abnormal sexual traits show not only in a precocious sexual development but in a disposition to become early absorbed in sexual imaginations. If in later life a dementia praecox breaks out then these imaginations play the most important rôle. Freud has shown how childhood wishes return in dreams of adults; they also reappear in the dementia praecox hallucinations. Are we to regard these morbid fancies as early signs of dementia praecox, or does the individual who later becomes a dementia praecox merely make use of the early sexual experiences and imaginations? A morbid constitution is regarded as the essential condition, the early traumata merely determine the symptoms. It is not possible to say what proportion of dementia praecox cases contain material drawn from the early sexual experiences. The form in which the sexual complex appears in dementia praecox is preëminently symbolic. The author concludes that the analysis of the symptoms of dementia praecox shows that in the psychology of this disorder the imaginative material of childhood and sexual experiences of youth acquire the same significance as in hysteria and in dreams.

The cases are reported with such brevity that one gets a very incomplete picture of the mental disorder and in at least two of the cases there are not sufficient facts to allow the conclusion that the diagnosis of dementia praecox is assured.

*Ueber Jung's 'Psychologie der Dementia praecox' und die Anwendung Freud'scher Forschungs-Maximen in der Psychopathologie.*

M. ISSERLIN. Cent. f. Nerv. u. Psychiat., 1907, XXX., 329-343.

Isserlin's communication is the first critical review to appear from Professor Kraepelin's clinic dealing with work of Freud and Jung in dementia praecox; it will, therefore, be read with considerable attention as reflecting in some degree the attitude of the Munich school not only

in regard to the dementia præcox problem but also in respect to the whole question of psycho-analysis and its use in psychiatry.

The author gives a synopsis of Jung's monograph on dementia præcox<sup>1</sup> and then begins his critical analysis. In the first place he complains of the unscientific method of reasoning employed by Freud and Jung and their failure to bring forth sufficient facts to make their claims seem even probable. He protests strongly against the dogmatic and arbitrary deductions and the jumbling together of fact and fancy in the psycho-analyses of Freud. When a patient forgets a certain word in reciting a verse and this word by means of a complicated series of associations is found to lead back to a former unpleasant experience we are not justified in asserting that the idea of this former disagreeable experience caused the word to be forgotten. In what way has any causal relation been shown to exist between the emotional complex and the disturbance in reproduction?

The author regards as wholly unfounded the claim that dreams, as well as many of the symptoms of dementia præcox and hysteria, express sexual longings in grotesque disguise or symbolic form. Jung is criticized for emphasizing superficial and transitory resemblance between dementia præcox and hysteria when no one doubts that there is a fundamental difference between the two disorders.

Isserlin acknowledges the great heuristic value of Jung's association experiments but thinks that the deductions made by Jung from the 'complex-signs'<sup>2</sup> are unjustified. The appearance of even several 'complex-signs' seldom allows a conclusion that a definite complex is present; what one can at most conclude is that an emotion is indicated. Jung calls a lengthening of reaction time a 'complex-indicator' and neglects all other factors which might prolong the reaction time. One must never forget that the usual association experiment reveals to us only the beginning and end of a complicated process, and when we conclude that a definite complex is present we assume something not demonstrated by the facts of the experiment.

In the analysis of the dementia præcox case published by Jung in his book, a marked fluctuation in reaction time was noted; prolonged reaction times, particularly when accompanied by qualitative changes,

<sup>1</sup> For other reviews of Jung's work see articles by Adolf Meyer, PSYCHOLOGICAL BULLETIN, Vol. 4, No. 6, June 15, 1907, p. 196; and C. Macfie Campbell, Rev. Neurology and Psychiatry, Vol. 5, May, 1907, p. 411.

<sup>2</sup> Prolonged reaction time, faulty or superficial associations and the forgetting of the associated word when the stimulus word is repeated are spoken of as 'complex-signs,' indicating that a complex of ideas of strong emotional value has been struck.

were attributed to the influence of a complex. But just in this case Isserlin thinks it is far more probable that the phenomena mentioned are due to a primary disturbance in will and activity rather than the result of an indirect and complicated participation of a complex acting through the intellect.

The author proceeds to discuss the general psychological basis for Jung's views. He recognizes in the whole exposition a 'modified association psychology.' Its characteristic is the splitting of the mental experiences into complexes of ideas, and in this respect is to be contrasted to the psychological principle which holds that a unitary consciousness forms the basis of our mental life.

Jung's psychology is throughout atomistic; instead of an undivided consciousness it offers us a mosaic of psychic molecules. The complexes are thought of as ideas bound together with a strong emotion and they lead a more or less independent existence apart from the complex of the real self. Conscious phenomena are regarded as a creation of these autonomous complexes. The normal mental activity finds among these created complexes no acknowledged place. The autonomous complexes take on human characteristics, they become transformed from aggregations of ideas to 'special souls.' They think, act, hate and love, they drive out and are driven out, make use of secret ways and sharp practices like a clever diplomat. They become imaginary personalities and restrict the activity of the real self. The object of the psycho-analysis is to furnish an outlet for these mental parasites — it allows them, so to speak, to live their life out.

Such a doctrine the author thinks deserves the characterization of a 'complex mythology,' and he sees nothing in the whole exposition to indicate anything more than that we are dealing simply with obsessive ideas.

Being without an empirical-objective foundation for a psychopathology, our psychiatric conceptions are still largely subjective and colored by feeling — this alone has made it possible for one to believe that the morbid manifestations in dementia *præcox* are in truth actions of a concealed reason. Having no objective data to disprove such a supposition, the author feels that he has performed his duty by pointing out the complications and improbabilities of the claims, the questionableness of the method and the insufficiency of the general (psychological) foundation.

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**GALVANIC REACTIONS AND ASSOCIATIONS.**

*Psychophysical Investigations with the Galvanometer and Pneumograph in Normal and Insane Individuals.* FREDERICK PETERSON, M.D. (New York), and C. G. JUNG, M.D. (Zürich). Brain, 1907, XXX., 153-218.

The purpose of the investigation was to study the value of the so-called 'psychophysical galvanic reflex,' as a recorder of mental changes in connection with sensory and psychical stimuli. Observations were made at the same time on the accompanying respiratory phenomena so that a comparison could be made between galvanometric and pneumographic curves taken simultaneously under the influence of various stimuli.

In 1890 Tarchanoff discovered the influence of mental conditions on the galvanometer. He observed that when the human body was brought into a circuit, a deflection of the galvanometer occurred if various stimuli (heat, cold, tickling, pin pricks, etc.) were applied to the skin. He found further that it was not necessary to actually apply any physical irritation to the body, for if the proposed stimulus was threatened or presented to the imagination there occurred a deviation in the galvanometer. He then saw that the mere recollection of fear, joy or any kind of strong emotion caused the galvanometer to swing. His next point was that abstract mental exercise such as calculation did not affect the galvanometer unless there was some accompanying exertion. He noted that the emotion of expectant attention or anticipation had a marked effect on the galvanometer. Tarchanoff identified the phenomena with changes in the sweat glands and spoke of a secretory current of electricity in the explanation.

In 1905, Müller rediscovered this psychophysical galvanic reflex and it was then taken up by Veraguth, a neurologist of Zurich, who corroborated the early findings of Tarchanoff but felt that no satisfactory explanation of the phenomenon was at hand. He argued against its being due to change in resistance dependent on alterations of quantity of blood in the vessels beneath the electrodes, because the reaction still occurred when the skin was rendered anæmic (Esmarch bandage) or surcharged by venous stasis. He also excluded participation of perspiration by drying the skin of the hands with formalin.

Jung, whose first paper has already been reviewed in the BULLETIN,<sup>1</sup> saw in the galvanic phenomenon a means of registering graphically the results of the association experiment and he was able to demonstrate that when the stimulus word was connected with some

<sup>1</sup> Vol. 4, No. 6, June 15, 1907, p. 197.

emotional complex deflection of the galvanometer occurred, while indifferent stimulus words produced no effect on the instrument.

As to the physics and physiology of the galvanic reflex, Peterson and Jung regard the sweat glandular system as probably the chief factor in the production of the electric phenomenon—the change in resistance, on which the deviation of the galvanometer depends, is brought about by a saturation of the epidermis with sweat or simply from a filling of the sweat-gland canals or perhaps also by intra-cellular stimulation. The path for the stimulation of the sweat-gland apparatus would be in the sympathetic nervous system.

Certain physical causes, such as amount of pressure on the electrodes, temperature and extent of the contact surface, deep breathing, coughing, etc., cause fluctuations of the galvanometer, but deviations from such factors can be recognized and differentiated from those depending wholly on psychic influences. Of the psychic factors which cause the galvanometer to swing in normal individuals, expectation (affect of attention) and emotion are the most important. Every stimulus accompanied by an emotion causes a rise in the electric curve and directly in proportion to the liveliness and actuality of the emotion aroused. *The galvanometer is thus a measurer of the emotional tone and an instrument of precision in psychological research,* while the amount of deflection is in direct proportion to the actuality of the emotion, yet the presentation to the imagination of an emotion outlived causes a deviation, depending on the capacity of the person to live over the old emotion in his imagination.

In the experiments a set series of stimuli was used, such as a loud whistle, a call by name, a loud noise, threat of a prick with a needle, questions of a more or less personal nature, etc. It was found that the reaction diminished with repetition of the stimulus. After a stimulus a latent period of one to three seconds intervenes before deflection of the galvanometer occurs.

The analyses of the pneumographic curves indicate that there is not the intimate relationship between the respiratory function and the subconscious emotional complexes that exists between the sweat glandular system and these emotions. "Respiration is an instrument of consciousness—you can control it voluntarily but cannot control the galvanometer curve."

In the field of morbid psychology the authors studied the galvanometric reactions in eleven cases of dementia præcox. A peculiar disturbance of the emotions has been described as the chief characteristic of dementia præcox. The deeper analyses of Freud and the asso-

ciation experiments of Jung show that in both hysteria and dementia præcox there exist certain thought complexes associated with strong emotional tone, embodying, as a rule, experiences preceding the development of the mental disorder. These psychological antecedents determine, in fact, the symptoms (*e. g.*, content of delusions and hallucinations).

In hysteria Freud has been able to demonstrate conscious or subconscious constellations which dominate the individual for years; such a morbid complex plays the part, so to speak, of an independent being.

The chief feature of dementia præcox is a defective reaction to stimuli in the environment; this defective psychological adaptation, expressed mainly as an attention disorder, is the result of the dominating complex of ideas of strong emotional value. The extent to which the patient will react and show adaptation to external stimuli depends on the degree to which the psychic activity is bound up with the morbid complex — this fact, the authors claim, is demonstrated by the galvanometer experiments.

In curves from cases of hebephrenic and paranoid forms of dementia præcox nothing striking was observed, but in the katatonic types extraordinary variations from the normal were obtained, the most characteristic features being a prolonged latent period and diminution in the deviation of the galvanometer so that in some cases the instrument recorded no response to any form of stimuli applied to the patient — the tracing obtained being merely a straight line.

In the association experiment, according to the method of Jung, an emotional complex (either conscious or subconscious) is revealed (1) by prolonged reaction time; (2) by utterance of a striking or unusual reaction word; (3) by failure to remember the reaction word or substitution of another word when the list of stimulus words is repeated. The behavior of the galvanometer during the association experiment was investigated to ascertain whether the psycho-galvanic reflex runs a parallel course with the complex indices just mentioned. In four normal persons the authors found (1) evidence of a parallelism between length of reaction time and height of the galvanometer curve; (2) associations that are changed in reproduction present an average plus difference in height of wave over those that are reproduced unchanged.

In the two dementia præcox cases studied, the most striking result was lengthening of reaction times, being extraordinarily long when connected with a complex. In the relations between the galvanom-

eter curves and the associations nothing different from the normal was found. The authors conclude that in dementia *præcox* little of a pathological nature is manifested in the general and regular mechanisms of thought but rather in the manner and method of reaction of the individual to his complexes. Nearly all of the symptoms are determined by an individual complex—this is especially true for the delusions and hallucinations. A series of other symptoms is dependent upon indirect disturbance of association by the complex. These facts explain why we do not discover any elementary disturbances—the dementia is shown only in the most delicate psychological relations. Therefore we look in vain for simple, elementary disturbances common to all cases.

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*Diagnostische Assoziationsstudien. XI. Beitrag. Ueber das Verhalten des psychogalvanischen Phänomens beim Assoziationsexperiment.* L. BINSWANGER. Journ. f. Psychol. u. Neurolog., 1907, X., 149-181; XI., 65-95.

Binswanger's study is the most complete and perspicuous presentation of the 'psychogalvanometric' method of Veraguth and Jung. Like the other methods (Tarchanoff's and Sommer and Fürstenau's), it seems to record phenomena greatly influenced by fluctuations of perspiration. The rapidity with which the reactions occur cannot be roughly physical or roughly chemical, but we must accept such events as can be regulated, promoted or inhibited persistently by the central organ. Mere changes of contact do not explain the facts, because even under water the fluctuation of the current is obvious. Involuntary pressure upon the electrodes does, however, modify the amplitudes of the curve perceptibly. Such reactions as sighs act only in a measure, as they imply a psychological stimulus. Among mental activities only the affective processes (in the sense of Bleuler) have an influence. Intellectual work (mechanical addition or reading) or simple sensory impression have no effect.

What led to the study was the evidence furnished concerning 'complexes' (see the reviews of the association studies of Jung in previous years). 'Complexes' call in most cases for a response of the galvanometer, which exceeds the width of the average reaction. In any association-experiment one would distinguish the 'association-curve,' that is, the curve of the whole string of reactions, and the secondary waves, which interest us here. The typical complex-wave consists in one very long rise and a slope with short tertiary rises.

The general curve has a steady rise, the slopes of the secondary waves are therefore in contrast to it. The secondary waves vary greatly. A picture similar to the drop of a complex (or secondary) curve is obtained, (*a*) where a strong affect exists apart from the experiment; (*b*) by active blocking of attention from the experiment; (*c*) by external distraction.

These facts can also be expressed as follows: An existing affect or lasting concentration of the attention on matters outside of the experiment inhibits the psychical elaboration of the stimuli. It remains poor in association and in emotion. From the lack of new affects there ensues a lack of new innervation and therefore also the disappearance of secondary waves. The gradual sinking of the curve goes with the disappearance of the acute affect. Wherever there is an increase of innervation there is a reduction of resistance, or wherever there is an inhibition or lack of innervation the resistance increases (in rest, sleep or purely intellectual work).

Prolongation of the reaction-time without simultaneous increase of the secondary curve may occur where there are intellectual difficulties, such as indistinct perception of the stimulus word or repetition of the same unusual word as a stimulus, but much more frequently under the influence of perseveration. Prolongation of the secondary curve without simultaneous prolongation of the reaction-time may occur for purely linguistic reasons where the emotional fluctuation takes place, but where an easy reaction-word is at hand favoring a habit-reaction or sound association. In the latter case the electric reaction is the only way of finding the deeper significance, which is usually subconscious and can be established only by psycho-analysis. It seems that complexes which have been displaced from consciousness may affect the psychogalvanic phenomena.

The differences between the probable mean and the arithmetical mean of the secondary curves are a safer criterion of the emotivity of the persons than the differences between the two means of the reaction-times. In the latter, intellectual and linguistic factors may play a part, whereas the galvanometric curves are conditions *only* of affective psychic processes. Among the educated and non-educated men and women the mean of those reactions which coincide with excessive reaction-times is greater than the mean of all reactions. Therefore the excessive time-reaction coincides in the average in all four groups with excessive waves of the curve. The size of the secondary curves, moreover, depends on the number of complex parts and only the theory of complexes can give an explanation for the phenomena found.

A. M.

## APHASIA.

*L'Aphasie de Broca.* FRANÇOIS MOUTIER. Paris, Steinheil, 1908.

In a volume of 774 pages, Moutier spreads before us the material on which Pierre Marie based his 'Revision de la question de l'aphasie' (cp. PSYCHOL. BULL., IV., 180-193).

Moutier gives first a history of the precursors of Broca and the period of Broca and renders the graphic 'schemes' of aphasia from the simplest to the more elaborate one of Langdon, and a review of the effect of Marie's articles. The second part (pp. 71-166) takes up the really very frail anatomical material of Broca, and next the apparently corroborative cases of the classics (taking full advantage of the opportunity to show up the shamefully careless and uncritical character of so many aphasia-reports). There he shows the utter inconclusiveness of the cases of abscess, the usually insufficient description or excessive lesions of the traumatic cases, the uselessness for the diagnosis of tumors (not one case of tumor affecting *lF<sub>s</sub>* alone led to aphasia!). In the cases of softening, 107 involve the foot of *F<sub>s</sub>* but also much more (in 63 the entire Sylvian field, in 16 also frontal, parietal and temporal convolutions, in 13 also the island, in 13 also the 'lenticular zone'). In only 19 cases was *F<sub>s</sub>* alone involved, eleven times subcortically and only nine times the cortex, but usually with a flaw; but even those who include with *F<sub>s</sub>* a part of the island (as v. Monakow and others) and the more anterior parts of *F<sub>s</sub>* as well (Dejerine) are not allowed a solitary convincing case. To these 19 cases which merely seem to be in favor of a Broca center, he opposes 84 cases: 57 with integrity of *F<sub>s</sub>* but aphasia due to lesion of the lenticular zone (46) or of the island (11), and 27 cases of destruction of *F<sub>s</sub>* but without aphasia. Probably the best negative cases are those of Burckhardt, who removed parts of *F<sub>s</sub>* without producing aphasia. The transcortical motor aphasias (simple loss of spontaneous talk) too are disposed of as clinically and anatomically unfounded ('they are either Broca aphasias or Wernicke aphasias or dementias').

The appeal to the Broca center of the other hemisphere in the negative cases and in recovery is next discussed (pp. 115-128). Out of one hundred persons nine are left-handed and two ambidextrous. What this means cannot be explained. Right and left hemiplegias occur equally often (160 against 160 in eight years at Bicêtre); yet in none of these cases was there an aphasia with left hemiplegia, although, as stated, at least one of ten persons is left handed. Moreover, even in right-handed persons lesion of the right hemisphere

occasionally entails an aphasia, or lesion of the left hemisphere in a left-handed person. There is no definite rule. To appeal to the other side in reeducation is a purely hypothetical procedure. It certainly will not save the Broca localization.

After a useful report of studies on the distribution of the Sylvian artery (showing the reason for the rarity of isolated softening of  $IF_s$  and the frequency of an extension into the marrow of the Wernicke zone by lesion of an 'artery of the isthmus'), Moutier takes up the anatomical foundation of Marie's theory: the three cases of lesion of  $IF_s$  without aphasia, the anatomy of the 'lenticular zone' and the isthmus, and the nature of the lesion: hemorrhage oftener with anarthria, softening oftener with 'Wernicke' admixtures (paraphasia, etc.). A distinction between cortical and subcortical cases is not feasible. A review of the most recent cases and of the trend of opinions is not wholly free of ready satisfaction with those who give their support (with or without proving facts), and a mode of presentation of the opponents which is not altogether fair and certainly does not avoid giving the facts a turn favoring his own side. Rosenblath's case (softening chiefly of the motor and Broca cortex and part of the island) is said to have a lesion of the zone lenticulaire — the term is convenient for polemics.

The second part of the book deals with the clinical analysis of the nature and symptoms of Broca aphasia.

Trousseau is the originator of that part of Marie's claim which stamps aphasia as a loss of a special form of intelligence.

Anarthria is first discussed (pp. 178–191). It is clinically identical with what goes as 'subcortical motor aphasia,' but is made to depend on lesion of the lenticular zone and not of the 'pediculo-frontal bundle.' It is the loss of articulation of the word, not necessarily a paralysis. The anarthric does not know any longer how to speak; the pseudo-bulbar (with paralyzed tongue and lips) *cannot* speak any longer. The description includes exactly what is given in the classics as pure motor aphasia: reduction to a few syllables or words; agrammatic diction, but also dysarthria. All cases can be reeducated (one case recovered after ten years). The analysis of the picture and its mechanism is as vague as the term 'zone lenticulaire.'

The Broca aphasia or mixed aphasia has naturally a wider scope. The amounts of Wernicke aphasia and anarthria can vary quite independently of one another. The analysis given deals with the speech residuals which emerge from the initial usually complete mutism within about two or three months: The peculiar mixture of anarthric,

dysarthric, agrammatic, anomic and paraphasic disturbances; the difficulties in repeating words, the perseveration, the selective loss of languages, peculiarities in singing, the variations in reading, writing, calculation, mimic, the understanding and adaptability. As to prognosis, the anarthric side usually keeps pace, at first, with the hemiplegia, but is finally recovered from, while the paraphasia and jargon and the inability to copy print into script are signs of bad omen for ultimate reeducation. Hemianopsia is also used as an important measure of bad prognosis.

The *intellectual deficit* is partly general (in memory, descriptive mimic, and sometimes in emotional mimic, in association of ideas, in judgment, etc.), and partly specialized in language (reading, writing, understanding of spoken or written language). The alterations of these faculties come, develop, and disappear according to the ordinary rules of intellectual disorders generally (and this is really all that is implied when Marie calls aphasia an intellectual disorder). Indeed it is not always easy to distinguish aphasia and dementia.

Ribot's general law of regression in general and partial memory covers what is lost in aphasia: For general memory the sequence is: the recent facts, ideas in general, sentiments, acts; for partial dissolution (in the domain of memory of signs) the sequence is: proper names, nouns, adjectives and verbs, interjections, gestures — *i. e.*, the reversal of the *evolution* of language. The French aphasic never uses the future tense, which is a late acquisition. "Automatism explains the persistence of singing, without any music center." The so-called word-deafness is merely an intellectual defect, not sensory, and ought to be called defect of word-understanding. Moutier is here much more strict than within his field of anarthria. The disorder of word-planning is 'just a paralysis'; but the disorder of identification is not sensory or perceptive. Here we meet the problem discussed by me (*PSYCHOL. BULL.*, Vol. IV., p. 186, etc.), but it is not carried through consistently, because, as we see, Moutier slurs over the *degrees* of word-imperception.

The alexia (dyslexia is unfortunately used for the fatigability of reading — see *PSYCHOL. BULL.*, II., p. 274, foot-note) is similarly slurred over. The relation between pure alexia and general aphasia cannot be settled to my mind on considerations as to whether alexia is a deficit of the order of blindness, or on ground of the fact that reading is a late acquisition. At the same time I recognize from my own experience how difficult the analysis is in many cases, and how evasive the center theory.

In the discussion of *writing*, Moutier admits that sometimes the *Broca-syndrome* may consist merely of *anarthria and agraphia*, and the latter is then the only 'intellectual defect' (while others call it then part of 'complete motor aphasia').

The disorders of calculation are a decided index of intellectual loss, also the disorders of memory, attention and imagination (said to be in part at the bottom of the paraphasia). *Mimic* is very variable, and the patient has little capacity of analysis, as, when asked: What do you do when you go to sleep, a patient merely answered: 'Je m'endors,' unable to think of the fact that he would close his eyes.

The chapter on *verbal images* is of fundamental interest. Moutier attacks the complex tests of Thomas and Roux as too difficult for most patients and merely a measure of general intelligence. Thomas and Roux show the patient an object, and in order to test whether the patient who is unable to speak has the name 'in mind,' they give the patient a help by mentioning, among other not pertinent syllables, the last syllable or the middle syllable or the first syllable of the word wanted, whereupon the patient has to signify the recognition. In more than twenty-five cases of 'Broca aphasia' Moutier could never obtain the slightest result even with the first syllable. But how about pure anarthria and 'transcortical types'? The Proust-Lichtheim test (a request to indicate the number of syllables of the word wanted and not utterable) finds similar disfavor. Moutier merely tests the ability to recognize the name of an object when mentioned among others—which of course is a much simpler step, only a simple identification and no trace of spontaneous rousing. Thus simplicity is attained by reduction of ambition of inquiry.

Moutier makes much of the fact that Mirallié at least denies the existence of graphic images. Why the surrender of this one type and not of the others as well? What are the 'images'?

Dejerine had said that with pure (extrinsic) aphasia a patient was able to think in words, but with lesion of the language zone or true aphasia he loses the images and thinks with ideas only. This distinction seems impossible to Moutier. It is said to lead finally to a division of internal language into words, word-images and simple ideas—mere logomachic material.

It is true that the word is a sound with a meaning. The sound disappears with anarthria, the meaning with an intellectual disorder. This meaning can persist when the word is lost. A patient can know an ink-well without being able to remember the word for it. The word is merely a symbol, but beside it there are visual, auditory, tac-

tile and kinæsthetic memories, and they constitute the 'idea without word.' Yet the word is an essential element for general clearness. Language is not, however, derived from thought but it has emancipated thought from the material objects (Bergson). The word, in turn, is a unit; we remember the word and not the syllable or letters; oftenest we even think not in words but in word complexes. In man, thought is altogether carried on in words. The words are never evoked by a 'simple thought.'

Here Moutier passes into an anthology of philosophical and epistemological reflections. He finally concludes: "The biological mechanism of 'images' is closely connected with the exercise of memory and of the association of ideas, and closely subordinated to the capacity of attention of an individual." Since we do not know the intimate mechanism of memory, recognition, and association, and since images are poor contrivances, we do better to admit frankly that we do not know why any lesion determines aphasia.

The greater part of the book consists of abstracts of 387 pertinent cases of the literature, and a report of 25 cases of their own with autopsy, and 19 without autopsy, material which will be reviewed elsewhere. The bulk of the older cases is inconclusive and a painful evidence of the looseness of most of the recorded aphasia-material. Most of the cases of the author show what we all experience: deficiency of the clinical detail in most of the cases with autopsies. Unless systematic examinations are made as a matter of course, the autopsy finds the physician at the funeral of many opportunities. Whether the material of Marie is sufficient to force us to a retreat still remains doubtful to me. The anatomical material is not without anatomical flaws. His negative cases of lesion of  $F_3$  offer but insufficient evidence of never having had a transitory anarthria. But there *are* more suggestive cases quoted. Most of his positive cases are hopelessly diffuse and many of them would never have been called motor aphasia. To call them Broca-aphasia is a matter of definition.

Marie speaks as clinician of the old French school; most students of aphasia aim to speak as brain-pathologists, ready to utilize what anatomical and physiological evidence there is at hand, unfortunately at times too ready. But why the wholesale retreat to a very schematic formula and apparently too positive claims concerning the actual delimitation between the intrinsic and the extrinsic disorders and their relations?

The results of the contentions of Pierre Marie in the problem of aphasia might be put forth as follows: The entire tradition of speech

centers of special and independent word-components in definite localities of the cortex must be given up. There is but one complex worth being called speech or language and that forms a special part of 'general intelligence' and stands above the psychological subdivisions such as concept, percept and sensation. This language function is affected by lesion within the 'Wernicke zone' ( $T_1 + T_2 + Smg + ang.$  gyrus and the underlying white matter). There are, moreover, two forms of 'extrinsic disorders': anarthria due to lesions of the lenticular zone ( $IF_s$  being irrelevant), and alexia due to 'lesions in the field of the posterior cerebral artery'; other extrinsic disorders are not accepted (especially pure word-deafness is said not to be demonstrated). The true aphasia is not subdivided; differences in degree are admitted but the rules concerning these degrees are not formulated. There are no 'word-images'; but (p. 505) in Souques' case with more cortical lesion the vocabulary is said to have been smaller than in Rioutord's with more subcortical lesion.

What Rousseau described as 'Broca-aphasia' is anarthria + real aphasia. With this definition much of the nomenclature demands recasting. Broca-aphasia in Marie's sense is not merely 'the loss of the memories of the movements for the articulation of words,' *i.e.*, what Broca attempted to localize in  $IF_s$ , nor even the complete motor aphasia of the German writers, which includes with the loss of capacity to speak the inability to write and perhaps some difficulty in reading and even difficulties in understanding more complex language. But Marie includes even cases with paraphasia which is a plain mark of the 'posterior zone,' and accepts it even where there is not a systematic abolition of speech and limitation to recurrent utterances, but merely a certain reduction and perhaps only some dysarthria. In other words, Marie's 'Broca-aphasia' is an official and just recognition of the vague field of 'mixed aphasias' as worthy of the unit-name of a syndrome, but with a misleading name. Any complication of an anarthria in the sense of agraphia and still more of alexia, etc., Marie claims, must always be due to a lesion of the 'Wernicke zone,' and the pure motor aphasia or aphemia (without agraphia) he does not call aphasia but anarthria, a term which before was used in the more specific sense of loss of articulation in connection with paralysis in the organs of articulation, while anarthria in Marie's sense includes all forms of difficulty of articulation from complex and simple cerebral mutism to simple dysarthria.

My contention is that — (1) Marie's 'aphasia' is not a unit beyond analysis. It would consist of the elaborative or collaborative disorders.

Occasionally it appears in expurgated forms (as paraphasia and anomia and difficulties of 'intelligence' wherever the ready and correct use of spontaneously roused words is essential and fails). As a rule it is combined with — (2) 'extrinsic disorders,' disorders of the essential connections with the sensory and motor fields per se, and of the receptive or emissive mechanisms themselves — that which gives the 'elaborations' the sensory and motor material or substance. Of these extrinsic disorders I should recognize on the emissive side the anarthria and also many instances of agraphia, and on the receptive side at least the alexia and the word-imperception (loosely called word-deafness). Marie and Moutier push aside all the established extrinsic mechanisms and deny the very existence of the auditory receptive field, which I consider a decided mistake. They distract the attention from safe points by over-emphasizing the empirically-clinically important but extraneous issue of vascular distribution in alexia and by declining to take notice of the 'motor' cortex of articulation, etc. There is, however, a decided gain in the anatomo-clinical interpretation of the actual facts. The executive or planning mechanisms are probably more closely related to the lower part of the motor cortex than Marie and Moutier suggest. But they are right in emphasizing that these mechanisms suffer less lastingly, and perhaps not at all, by lesion in front of Ca, than through lesion beneath and behind the cortical area for articulation and phonation, through affection of the 'lenticular zone,' probably because there the arcuate bundle and uncinate bundle are affected besides the pyramidal component. Already Wernicke had felt obliged to invent a special course of the cerebral efferent or pyramidal bundles for speech when he concluded that it must run backward along the dorsal border of the lenticular nucleus before it reached the crus. Marie's faith in the lenticular nucleus is still far from conclusive evidence. By lesion in this direction (a coöperative significance of F<sub>s</sub> and F<sub>t</sub> is not to be excluded) true anarthria, independent of actual palsy, and true agraphia have been observed, but as v. Monakow shows, usually only as a transitory complex open to correction and reëducation. On the receptive side I should consider it necessary to account for auditory word-imperception and for alexia by special lesions where the 'word-deafness' and the 'word-blindness' really are demonstrated as such. The 'elaboration disorders' proper are more closely akin to the general intellectual disturbances in which the disorders of activity or apraxias play the chief rôle. They would have to be studied on the one hand with a view to showing their relation to the specified and more or less concretely involved 'sensory' and 'motor' elaboration-

centers, and on the other hand the relation to 'praxia,' i. e., general intelligence and its most direct somatic expression.

In other words, the 'Wernicke zone' is open to further subdivision and analysis, along the lines described in my contribution to the Forel Festschrift which will appear in the *Journal für Psychologie und Neurologie*.

Aphasia would then consist of:

1. Intrinsic disorders of elaboration not necessarily based on disorder of primary and even secondary identification of words, but more closely disorders of understanding. Their relation to the asymbolia-apraxia group is to be more closely outlined.

2. Extrinsic disorders (probably overrated in their fundamental importance by the associationists) : auditory, and visual and emissive: in the field of articulation and, in some cases, of writing. The disorders of writing seem to show that a sharp line cannot be drawn between intrinsic and extrinsic aphasia. There are evidently individual differences of vulnerability of the planning or emissive mechanisms. Marie has proved that  $F_3$  as a 'motor word center' has to furnish more conclusive credentials than are at hand. Whether *agraphia* depends necessarily on a lesion of the 'Wernicke zone,' and cannot be part of the effect of a lesion of the 'lenticular zone' in even its widest scope, is a question which may bring Marie's formula most decisively and quickly to a test.

We are under great obligations to Marie for his merciless onslaught on slovenly work. He himself would probably not consider his own conclusions as the last word, but as a practical anatomo-clinical formula, a stepping stone for renewed attacks with all the helps of cerebral pathology in its broadest sense. The 'clinic' of vascular lesions is at best dangerous ground, not quite as dangerous as the 'clinic' of tumors, but certainly a long way from being able to afford aloofness from the physiological and anatomical experiments.

Moutier had a difficult task in bringing up the rear of facts in the onward march of such a brilliant dialectic and polemic plea as were the three articles of his master. The actual material has rather weakened the argument and one's confidence in the accuracy of the work of Marie's helpers.

The problem of aphasia and apraxia is and will be the main entering wedge into the problem of cerebral activity of a psychological order, and it cannot be sacrificed to clinico-anatomical convenience.

A M

## SPEECH AND THOUGHT.

*Aerztliches über Sprechen und Denken.* G. ANTON. Halle, Marhold, 1907.

The auditory-facial-respiratory-articulatory reflex arch is superimposed by the contralateral perisylvian speech-zone, preëminently of the leading hemisphere. The receptive-elaborative (temporal) disorders give a disturbance which need not involve the actual thought as deeply—the patient need not even be aware of the jargon-character of his utterances. The motor disorders with the peculiar position of song and emotional speech and the recurrent utterances and the tardiness of reëducation for nouns are next mentioned. Writing, the re-symbolization of the words or thought symbols, and reading, have their special positions. Irritation of the speech mechanisms shows in hallucinations and hearing of one's own thoughts, and in forced speaking. Here begins the encroachment upon the process of thought, in the form of delusions. Wordless thought (Twardowski, 1894) is accepted; but the word and the word-image are the powerful form as shown in hypnotism and in wake suggestion, and the force of words had well be considered in the presence of patients and in wider circles. Speech is further open to influence in hysterical mutism; it is inhibited, facilitated in various emotional states; it keeps variably pace with the wealth and flow of thought (it would not be fair to judge the mountaineers merely by what they express in words). The speech-mechanism is also thought-mechanism—this is, in light touches, a sketch of what disease teaches concerning the relation of speech and thought.

A. M.

## MISCELLANEOUS.

*A Mind That Found Itself.* C. W. BEERS. New York, Longmans, Green & Co., 1908.

As an autobiographic sketch of a man who has passed through a cycle of a manic-depressive psychosis, and at the same time an appeal to more thought about the practical needs of the insane, this book deserves the widest circulation. Although it was exploited on its appearance by some sensational newspaper articles, it has nothing in common with the frequent attempts at revolutionary disclosures by ex-patients who carry a chip on their shoulder and have had the most detrimental effects on legislation and on the attitude of the legal profession and the public—detrimental to the great majority of patients while perhaps a protection for a few greedy for special rights. Fully restored, the author

is devoting himself to the promotion of the cause of mental hygiene, spreading of information about it to the public, and especially also organizing conditions so as to make impossible many abuses and unnecessary many hardships which beset those unfortunate enough to get mental disorders. Better work in the 'asylums,' in special hospitals, education of the physicians in psychiatric clinics, organization of those who are willing to work in local efforts to assist the patients who return from hospitals and those who are in need of early treatment, and gradually a campaign of efficient prophylaxis — this is the programme of Mr. Beers and of those who are uniting with him.

The book has been subjected to much scrutiny and bears all the marks of a faithful account. Searching inquiries have failed to bring forth any demonstration of misrepresentations. In its interpretations — which are by no means overdone — it may err at times, as in the attempt at the explanation of the after-effects of a fall; but these are trifles in comparison with the vivid description of *events*, as keenly remembered as they were keenly lived through at the time.

The book deserves careful reading as an intelligent layman's account of his experience during a most interesting and frequent type of recoverable mental disorder, and as a sociological document. It aims to be constructive, and therein lies its superiority over many other criticisms or defenses of existing conditions. To do this and yet to retain the reading quality of a story is a feat denoting a decided literary talent.

A. M

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#### NOTES AND NEWS.

THE present number of the BULLETIN, dealing especially with psychopathology, has been prepared under the editorial care of Dr. Adolf Meyer.

AT the International Congress for Philosophy, which meets at Heidelberg August 31 to September 5, Professor Hugo Münsterberg will preside in the section for psychology. Among the papers to be read at the general sessions is one by Professor Royce, of Harvard, on 'The Nature of Truth in the Light of Recent Discussion.' The American members of the permanent committee are Messrs. Baldwin, Carus, Ladd, MacFarlane, Schurman, and Strong. Membership tickets for the Congress (Mk. 20) may be obtained from the General Secretary, Dr. Elsenhans (Plöck 79, Heidelberg).

**THE**

# PSYCHOLOGICAL BULLETIN

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## THE PRESENT STATUS OF MEMORY INVESTIGATION.

BY DR. F. KUHLMANN,

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Two decades of experimental investigation have quite changed our conceptions of memory. A host of new questions raised by the facts discovered are before us in place of a small group of old problems. The nature of retention, the laws and forms of association, the rate of forgetting, the nature of the memory image were the topics in the foreground of discussion when Ebbinghaus initiated a scientific method for the study of memory. Some of these are still living questions, but the main interest has shifted into other directions. With the new method rapid progress has been made. The attempt to establish the memory curve for different time intervals and to determine the various conditions upon which the amount remembered depended was the main issue of the first decade of memory investigation. This, however, aimed only at determining the quantitative facts, the degree and manner in which the amount remembered varied with the nature of the material, age, sex, general intelligence, sense department, and other factors. Seeking an explanation for the facts followed logically as the next step. For the past several years the majority of quantitative memory studies have aimed to find this explanation in the analysis of the manner of learning and of recalling. The analysis of the memory consciousness has come to the foreground of memory investigation. In the meantime a number of other lines of memory studies have been opened. In the present brief survey of the field I shall attempt to consider the main groups of problems under the following headings: (A) The nature of memory curves and other quantitative determinations. (B) Memory analysis and the explanation of quantitative results. (C) Economy of learning and memory training. (D) Memory illusion.

*A. The Nature of Memory Curves and other Quantitative Determinations.*—The problem in establishing a memory curve is that of determining the rate of change, and its variations, in the memory of a given material as affected by the lapse of time from the moment of its perception until no trace of memory of that material remains. This has been measured in part in different ways. First, by the unaided recall method determining the amount recalled. Second, by the recognition method. Third, by finding the time saved in re-learning the material used. Fourth, by the recall method in which the units of the material are learned in pairs and one of each pair is presented a second time. Fifth, by measuring the time required for recall. That this curve would probably vary according to a number of different conditions was at once obvious. Quantitative memory studies have therefore been made (1) with material of different degrees of simplicity and continuity; (2) the material has been presented to different sense departments; the influence (3) of age, and (4) of general intelligence has been studied. The majority of the investigations made are concerned with two or more of these problems, and during the past several years quantitative studies have often aimed at the same time at the analysis of the memory consciousness.

1. The Simplicity and the Continuity of the Material. We may draw an arbitrary line between (*a*) simple and (*b*) complex material. To the former will then belong the pitch of a tone, the brightness of a grey or saturation of a color, visual distance, an unfilled time interval, and the like. Under the latter will be classed groups of colors, numerals, letters, nonsense syllables, words, forms, and objects. In both, the units have no necessary connection with each other. Both are therefore to be distinguished from what we may call (*c*) connected experience. Here belong passages of prose or poetry, a complex picture with variety and detail of content, the experience of an event. Obviously many other things might be mentioned under each of the three classes of material, but these are the things that have been actually employed in memory investigation.

The general character of the memory curve for simple material may be said to be established. The results obtained by the different investigators are in essential agreement. Relatively few of the quantitative studies with the complex material have aimed at the establishment of a memory curve. Their object has usually been the comparison of the different kinds of complex material and the study of the other factors, for which purpose only one recall, immediately after presentation, was employed. Of those in which more than one recall was

made the number has been limited to three or four, and none with the recall method have employed time intervals near the point at which all memory of the material had disappeared. Ebbinghaus' study, repeated by Radossawljewitsch using the same method,<sup>1</sup> gives the only results at present on the point in question. We, therefore, have as yet no memory curve for complex material which shows the whole course of decline in the ability to recall. On a memory curve for connected experience we have still less. In fact, no investigations have yet made that problem their aim. A few studies on memory illusion using this class of material, and giving the amount recalled correctly as well as the errors, have employed several time intervals.

2. The Dependency on the Sense Department. To determine the memory curve for each of the sense departments, keeping all the other objective conditions the same, would be a very difficult task, if not impossible to accomplish. This has never been attempted. Nor has any investigation been undertaken that compares the complete memory curves for any two sense departments. What we have in place of this are studies comparing visual and auditory presentation of the material for immediate recall, and determining the influence of accompanying motor processes. With some exceptions the material used has been verbal, and its vocalization is the motor process that has been considered. The general outcome of these studies may be stated in a word. Vocalization of the material while learning increases the ability to recall it considerably. Visual presentation of meaningless verbal material is always better than auditory presentation. But auditory presentation of meaningful verbal material is better than the visual with the younger school children. Thus we see that the dependency of the memory curve on the sense department has already been shown to be further conditioned by at least two factors — material and age.

3. The Dependency on Age. That at a certain period of childhood memory is better, at least for some things, than it is later was a general opinion before the question was studied experimentally. We know now that for immediate recall the ability to recall what has been once seen or heard increases gradually until maturity, some fluctuations appearing at puberty. Whether this is a change in actual memory ability is left for memory analysis to decide, and the indications so far are that it is due to the development of other functions. These results on the change in the memory span with age, however,

<sup>1</sup> 'Das Behalten und Vergessen bei Kindern und Erwachsenen nach experimentellen Untersuchungen,' *Päd. Monographien*, I. Bd., 1907.

do not give us memory curves for delayed recalls after different time intervals. Again, no studies on this have been undertaken with the recall method. Radossawljewitsch has repeated Ebbinghaus' experiment with children of different ages as well with adults. He found that the time saved in re-learning decreased with age for all but the five- and the twenty-minute intervals. But the number of repetitions required for learning the first time was greater for the younger children.

4. Dependency on General Intelligence. The relation of memory to general intelligence received attention early in memory investigations and has been an object of occasional interest since. On the whole, the memory span has been found to increase with general intelligence as indicated by school grades, but with marked exceptions occurring. Whether memory permanency bears the same relation to general intelligence as does the memory ability in immediate recall we do not know. Since the memory span is largely determined by a brief concentrated effort while memory permanency is more dependent on repetition in learning, it is likely that this relation is quite different for the delayed recalls.

Thus we see that the main line of quantitative studies has been concerned with the various objective conditions that influence immediate recall. Memory curves showing the whole course of decline of memory for different time intervals have been established only for the simple material, with the recognition method, and for nonsense syllables, with the Ebbinghaus method. Scattered results are bringing to light the importance of determining the whole memory curves for all the conditions that influence immediate recall. Considering the variety of factors that enter into the manner of learning and of recall and how these are influenced by objective and subjective conditions, it is not likely that these conditions affect the delayed recalls in the same way and degree as they do immediate recall. Since some things we wish to remember only for the moment of a given occasion while others we want never to forget, it becomes important to know the whole memory curve with all the conditions that affect each part.

#### *B. Memory Analysis and Explanation of Quantitative Results.*

— The differences in the amount remembered for the different conditions have been used as a means of analyzing the processes in consciousness. We may therefore speak first of objective methods of analysis.

1. Objective Methods of Analysis. The procedure consists of varying the objective conditions of learning a material with the aim of hindering, eliminating, or of helping a certain mental process, and

then inferring as to the presence and importance of that process from the amount that is remembered in the different cases. Thus from results obtained in this way we have made inferences (*a*) as to the rôle of associations in memory in comparing simple and complex material, finding that according to the nature of the material all may be forgotten in the course of a minute or a certain portion of it may be remembered permanently. (*b*) In comparing visual and auditory presentation of the material without distraction, we have inferred from the amount remembered as to the relative prominence of visual and auditory processes. (*c*) In regulating the accompanying motor processes, especially vocalization, we have determined the part this plays. (*d*) The last has been termed the distraction method, which has been employed also in further comparing visual and auditory presentation. Going on the principle that visual stimuli distract visual processes more than they do auditory processes, and auditory stimuli distract auditory processes more than they do visual, such distracting stimuli have been introduced during the visual and the auditory presentation of the material to be memorized. Three other objective methods have been used, but less frequently. (*e*) In presenting the material the subjects have been asked to direct their attention in the one case to its visual aspect, in the other to its auditory aspect. (*f*) In the use of verbal material different classes of words have been chosen designed to suggest imagery from the different sense departments. (*g*) The material has been arranged in different spatial orders in presentation, designed to aid the visualist in different degrees, and assumed to affect less the learning or memory of those of a non-visual type.

The assumptions underlying these methods are not often clearly stated, and to this extent, of course, it is not always evident what is to be inferred from the quantitative results as to the factors in the memory consciousness. The correctness of the assumptions apparently made has for the most part not been tested by direct, introspective observation. There are some indications that we have made probably a number of errors with the objective methods of analysis. We may call attention to the following: (*a*) The difference in the ability to remember simple and complex material and connected experience is probably not due entirely or even mostly to a difference in associative connections that appear in consciousness, but is influenced probably by other, quite different factors. (*b*) So far as associations enter, we should also distinguish between their presence and function in learning and their presence and function in recall. They are probably more numerous in the former than in the latter and their manner

of functioning different. (c) Presenting a material to different sense departments and proving a better memory for one than for the other is not reliable evidence that the subjects in question work or think more in the corresponding class of imagery even for the particular kind of material that is used. It may be a result of associated processes that enter in different degrees for the two sense departments. We may call attention, for example, to vocalization and concrete imagery in the case of presenting verbal material visually and auditorily. (d) Classes of words chosen to suggest certain classes of imagery may not do so when used as material in a memory experiment, as has been shown.<sup>1</sup>

If these suggestions and others that might be added were all valid objections, it is not to be concluded that all objective methods of analysis should be cast aside as misleading and useless. This would limit us to the analysis of the memory of normal, adult, and even laboratory trained subjects. The proper procedure, as it seems to the writer, would be to employ direct observation first, and work out the analysis of memory as influenced by the objective conditions of the methods. This would at least lead to the discovery of the variety of factors with which we have to deal, though not to an extensive knowledge of the different ways of their combined functioning with different individuals. It would thus not do away with the need of objective methods of analysis, but would give us a basis for developing more reliable ones. The general course of memory investigation has reversed this procedure.

2. Analysis by Direct Observation. With several exceptions only, the introspective method has never been the chief one used in any individual memory study. But occasional introspective observation, where the dominant interest is still in the objective results, has been considerably on the increase. In the memory studies proper, however, it has been directed for the most part to the learning process, and not to the analysis of the manner of recall. Thus a good deal has been determined in this way about the presence and nature of vocalization, of associated imagery in learning a given material, and about the manner of influence of a variety of conditions of too miscellaneous a nature to be reviewed here. The manner of recall has not received much attention, if we exclude the results of mental imagery studies. Indeed, the results of these are of no great avail in any given memory study. The learning of any memory material sets up a number of

<sup>1</sup> Pohlmann, *Experimentelle Beiträge zur Lehre vom Gedächtnis*, Berlin, 1906.

processes in an extraordinary complexity of functional relationship that varies with every changing factor. To know simply the type of mental imagery as determined by the usual methods gives us but meager detail on what the total recall process may be like. We may say confidently that the latter is not a repetition of the processes present in learning in any case. The problem is to unravel the complex in both learning and recall and establish the differences between the two for each given case. The determination of the type of imagery thus becomes one step in the analysis of the recall process in every memory investigation that aims at this analysis. Some attempt at this determination has been a part of a large number of the more recent studies that still aim primarily at other matters.

With objective methods of analysis mostly yet in the state of development, and no extensive use made of direct observation, it follows that we have not progressed far in the analysis of the memory consciousness. A good mass of data has accumulated on the conditions that influence the rate of learning and the permanency of memory. But we have for the most part no established explanations of these quantitative results, which await the analysis of the mechanism of consciousness that produces them. This is the field in which lie the immediate and most urgent problems.

*C. Economic Methods of Learning and Memory Training.*—In the older psychology the laws of association alone accounted for recall. To the *a priori* deductions of these laws was added James' dictum that native retentiveness in memory is unchangeable. This might seem, and undoubtedly has seemed to many, to hold out but meager hopes that anything should be discovered that would improve learning and memory. We have quite outgrown this view. Problems concerning economic methods of learning are increasing rapidly, and they are leaving the laws of association and the question as to the permanency of native retentiveness out of consideration. The general aim of the studies here is clear. The objective conditions under which a material may be learned may be varied in numerous ways. The mental processes naturally induced under any of these conditions have been found to be very complex. Without changing the objective conditions, the learner may consciously change and direct his manner of learning in a large degree. Will one naturally find and follow the best methods of learning? This is not to be assumed, and has been found to be by no means the case. Thus we have given the general problem of finding the objective conditions of learning, and the manner of directing the learning consciously that will save the most time in

learning and produce the greatest permanency of memory. Obviously in this field also we may employ objective methods only, and determine the objective conditions that will give the best quantitative results, or we may in addition use direct observation in the analysis and determination of the conscious processes that produce them. The former, being the purely empirical procedure, does not give us the rational guide in finding the most favorable conditions for learning and memory that the latter offers in the explanation of the quantitative results that it can give. On the whole, more attention has been given to analysis by direct observation in the studies on economic methods of learning than in those already considered.

In considering the results no definite line can be drawn between these studies and those just discussed. Practically all that contribute anything to a knowledge of the conditions on which the amount that can be remembered depends, and to the analysis of the memory consciousness, contribute also to means of determining economic methods of learning. We can call attention only to the general results of a few problems on which investigations have been made with this immediate practical aim in view. (1) It is very much better to break up a given total learning time into several learning periods than to spend it all in one sitting, individual differences and other conditions entering to determine how much is gained by this division of time. The determination of the latter is the main issue. (2) In learning a given amount of material it is better to learn it as a whole than to learn it part by part, special conditions again to be considered. (3) Practice in learning a given kind of material improves the ability to memorize other kinds of material. Several different possible explanations have been offered as to the manner in which this general improvement is brought about. (4) The best conditions and manner of learning for immediate recall are different from those that give the most permanent memory. (5) The natural manner of learning, as well as the type of imagery in recall, varies considerably with different individuals. Methods must therefore be adapted to the individual, but few generalizations so far made holding entirely for all persons.

These investigations have employed verbal material almost entirely. This is rather an indication that we are only at the very beginning of the task set. Undoubtedly we may continue profitably for some time in the manner begun. But it seems that more practical results would be obtained if the investigations were made of the learning and memory processes just as they are found in the tasks of the schools and in life. We have learned at every point how materially a slight change in the

objective or subjective conditions of a memory experiment may affect our results. The total memory process set up in memorizing a group of nonsense syllables or other verbal material is surely very different from what is given in the memory tasks of the schools. It is therefore likely that many of the results of the present class of investigations will fail of valid application because of the many unforeseen factors that we do not discover.

*D. Memory Illusion.*—Only during the past few years has memory illusion received serious attention from experimental investigators. Stern and his co-workers, moved by the great need and practical value of a more accurate knowledge of the frequency of memory illusion in normal memory, have undertaken a number of studies aiming at this quantitative determination. Like the amount that can be recalled correctly, the degree of memory illusion has its host of objective and subjective conditions. A few of these have also already received consideration. The material used and the procedure has been such as to make the memory task in the experiment as nearly like that of everyday life as possible. Thus complex pictures, the witnessing of a scene, of an event taking place, have been employed. This should make the results more immediately practical in their application, but it encounters considerable difficulty in establishing a unit for the material, on the basis of which quantitative determinations must be made.

What was said above concerning quantitative studies, objective methods, and direct observation as a method of analyzing memory consciousness, may be said in regard to the study of memory illusion. The determination of the degree of memory illusion is one line of investigation; the study of its character, variety and causes, the analysis of the memory illusion consciousness is yet to be begun. The latter approaches an old problem in a new way, the study of cognitive consciousness.

## THE PROBLEMS OF COLOR-BLINDNESS.

BY PROFESSOR J. W. BAIRD,  
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The past few years have witnessed an unprecedented activity in the investigation of the problems of vision. A necessary consequence of the extension of our knowledge has been a definitizing of our concepts, and a recognition of more and more minute distinctions. Hand in hand with this development has come the introduction of a complex technical vocabulary — a vocabulary which has grown to such proportions as to confuse and bewilder the reader. Meanwhile the scientific literature of the topic has become so voluminous that the psychologist can scarcely master it without neglecting other provinces of his domain. While these factors have contributed to hamper the progress of the general reader's knowledge regarding many of the phenomena of vision, the situation seems to be particularly unfortunate in the matter of color-blindness.

Only one hundred and fourteen years have elapsed since Dalton first called attention to the interesting group of phenomena which are now known to be symptoms of color-blindness.<sup>1</sup> And while it is remarkable that such a conspicuous abnormality had so long escaped notice, it is equally remarkable that, when once pointed out and described, it excited so little interest. During the next fifty years it was scarcely mentioned in the literature; and not until toward the close of the past century did scientists come to recognize the important part which it was to play in the explanation of the facts of normal color vision. Within recent years, however, they have come to regard color-blindness as an exceedingly significant biological variation which enables them to observe, if not the evolution, at least the disintegration of the color sense. Color-blindness is not a mere idiosyncrasy — the peculiar personal possession of a particular individual. It is a typical deviation from normality — an imperfection whose essential characteristics are uniformly present in a great variety of individual cases. It is, in all

<sup>1</sup> An earlier reference to color-blindness dates from 1787. But in this earlier case the patient had died before an opportunity was afforded for a thorough examination, and the published account is meager and inadequate. Dalton's 'Extraordinary Facts relating to the Vision of Colors' appeared in 1794 (*Trans. of the Lit. and Philos. Society of Manchester*).

probability, the product of an arrest at a half-way stage in the development of sensory equipment. And it seems probable that a knowledge of the typical forms and of the essential character of this arrested development may throw light upon the nature of the retinal process by means of which normal color vision is accomplished. And it is for that reason that scientists have labored so assiduously in an attempt to obtain a complete description of the abnormality.

Color-blindness is still far from being a closed issue in the psychology of sensation. But while certain controverted points are still in dispute, it is possible, in the present status of our knowledge of the subject, to present numerous facts upon which all investigators are in agreement.

The individual who possesses a normal color system is capable of discriminating between a great variety of color-tones; he sees the spectrum as a continuous band — save for the Fraunhofer lines — in which each tone represents a gradual transition between its neighbor on the right and its neighbor on the left. When the conditions of presentation are no longer optimal, he may fail to discriminate between spectrally adjacent tones; but, unless the conditions be exceedingly unfavorable, he never confuses colors selected from widely separated regions of the spectrum. Now, we may regard any marked deviation from this normal capacity as a form of color-blindness. It must be borne in mind, however, that color-blindness is a defect of *color-sensing*, not of *color-naming*. The circumstance that one individual describes a certain spectral region as green or greenish, while another calls it blue or bluish, indicates nothing more than that, in the vocabularies of these two individuals, the same significance does not attach to these two color-names.

From the point of view of its origin, we may distinguish between congenital and acquired color-blindness. The congenital form is by far the more common; and it is to this form that investigators have most frequently directed their attention. Congenital color-blindness is believed to be common to about three per cent. of the human race; but in the absence of reliable comprehensive statistics one cannot do more than make a rough estimate as to its frequency. As to its distribution, it is more common in men than in women — a fact which may probably be referred to the circumstance that men for generations have had relatively little interest and little practice in the discrimination of colors. The defect is of frequent occurrence among the lower animals. Color-blindness is believed to be transmitted by heredity (Bateson, Nagel); and its prevalence among certain groups of individuals,

such as the Society of Friends, would seem to support this view. Acquired color-blindness may result from certain traumatic conditions, from disease and from the action of chemical agents. A wound in the region of the eye may produce an impairment of color vision, with little or no decrease of visual acuity for uncolored light. Certain neurotic conditions and diseases of the retina and optic nerve proper may be attended by similar changes. Doses of santonin and of other drugs produce typical disturbances of color vision. And it may be mentioned in this connection that a continuous chromatic stimulation, as when one sits in a colored illumination, reduces the sensitivity to that color, and hence produces an abnormal condition of color vision.

The tests which are employed for the detection of color-blindness have reached a high state of development. The earliest form of test still bears the name of Holmgren, although that investigator cannot claim priority for its discovery. This test, in all its various forms, consists in having the suspect select, from a variety of colored objects, those which match a given sample. While this procedure may be of service for practical purposes, provided it be superintended by an efficient examiner, its diagnostic and investigative value is limited. The Stilling plates consist of groups of vari-colored patches so arranged as to form more or less readily legible numerals. This test also is of slight value, save as a preliminary for a more thorough-going examination. These two, however, are the forms in common use; and Stilling's publication reached its eleventh edition during the past year. A much more adequate test is that recently devised by Nagel — himself a color-blind. It is unfortunate, however, that his scheme has recourse to color-naming — a capacity which may be subject to well-marked individual variation among persons who possess the same color sensitivity. For the purposes of the investigator, the test which employs 'Rayleigh's equations' possesses unequalled advantages. On account of the numerous variations in cases of defective color-vision it is impossible, by any system of unchanging stimuli, to provide colors which shall appear exactly alike to any considerable number of color-blinds. It is therefore essential to devise some means of gradual variation of stimulus. This condition has been met in the scheme which resorts to a determination of the laws of color-mixing for the abnormal retina — a scheme which also provides for the expression of its results in most illuminating form. This method is essentially an extension of a plan which was introduced by Lord Rayleigh in 1881; it is usually referred to as the method of Rayleigh's equations (or confusion equations). It may be described as a systematic attempt to determine

what proportions of given color-tones must be combined to produce a mixture which shall be indistinguishable, in color and in brightness, from another color stimulus. For example, the examination may consist in matching a spectral yellow by an appropriate combination of spectral red and spectral green.

Every attempt to present a detailed characterization of color-blindness must encounter an obstacle in the matter of terminology. It may be stated at once, however, that two chief types of color-blindness are found. Total color-blindness consists in an inability to distinguish any color from gray. Those individuals who are able to distinguish certain colors only are said to be partially color-blind. The most frequent errors made by partial color-blinds consist in confusions between red and green, although a few cases have been reported in which yellow was confused with blue. Inasmuch as all the tones in the color system of the partially color-blind may be reproduced from mixtures of two colors (yellow and blue in the former case, red and green in the latter) such a system may be said to be dichromatic. Trichromatism would refer to a normal color system, since all possible tones may be reproduced from the mixture of three colors, appropriately chosen and appropriately combined. In the scientific literature, particularly that of Germany, color systems are usually described in terms of dichromatism and trichromatism. It seems unfortunate that a more significant terminology has not found favor; for one finds it quite as easy to speak of red-green blindness, blue-yellow blindness and normal color vision.

The red-green blind sees no difference, save in brightness alone, between a certain red, a certain green and gray. The green which confuses him has a bluish hue. It lies between the  $\delta$ -line and the  $F$ -line, having a wave-length which varies, for different observers,<sup>1</sup> between  $500 \mu\mu$  and  $490 \mu\mu$ . His other missing color is a (non-spectral) purplish red, the complement of the bluish-green. For the blue-yellow blind the neutral bands appear in the vicinity of the  $D$ -line, and at the region of the complementary blue.

The examination of red-green blinds has revealed the existence of a well-marked individual difference. And indeed the variation seems sufficiently great to justify the division of this group into two sub-types. The most striking difference appears in matches between red and gray — certain members of the group selecting a light gray while the others as uniformly select a dark gray. Von Kries has suggested

<sup>1</sup> It is probable that this variation in the 'neutral band' may be referred to variations in the pigmentation of the lens and of the macula.

that the latter form of abnormality be called *protanopia* and the former *deuteranopia*. Here again let us pause to enter an objection to the choice of non-significant terms. The Rayleigh equations emphasize the essential difference between the two sub-types. When red and blue are mixed to match blue-green the protanope requires a relative excess of red in his purple mixture; and in similar determinations with red and yellow the protanope may demand five times as much red as the deuteranope.

Besides the types of abnormality which have been described, certain less conspicuous deviations from the normal are occasionally found. The least serious of these has been called anomalous trichromatism (König). Although not fully understood as yet, anomalous trichromatism seems, when brought into relation with normal sensitivity, to present points of qualitative similarity but of quantitative dissimilarity. Attempts have been made to trace its origin, not to a retinal source, but to an individual variation in lenticular and macular pigmentation. This interesting and baffling variant was first reported by Rayleigh in 1881. In an investigation where several individuals were asked to match a mixture of spectral red and spectral green with spectral yellow, Rayleigh found that the results of most observers group themselves around a common average. Certain individuals, however, make their mixtures much redder, and other individuals much greener than the average. Here again then we must distinguish between a protanopic and a deuteranopic sub-type. Investigations since Rayleigh's pioneer publication have shown that the former sub-type is much more numerous than the latter.

Another variation from normal color vision has been designated by the exceedingly inappropriate name of 'color weakness.' At an early stage in the development of our knowledge of this defect, investigators believed that it consisted in nothing more serious than a slight but uniform blunting of sensitivity to all colors. And this view still persists in the popular mind—probably as the result of the misleading character of the name by which it is commonly known. Investigation has shown, however, that the defect is much more intimately related to the typical forms of dichromatism than its name implies. The individual who suffers from 'color-weakness' is unable to pass even the least searching tests of color-blindness; and his abnormality is most strikingly revealed in the presence of reds and greens. The defect becomes most conspicuous under relatively unfavorable conditions of stimulation. Confusions are most numerous when color-stimuli subtend small visual angles; it has been established, however, that reduced

brightness and decreased saturation also make discrimination more difficult.

The practical application of the results of investigations in this field has come up for discussion in recent years. The aesthetician and the painter have interested themselves in these as in other visual problems. But the most natural direction in which to turn to find a practical application has proved to be toward the field of railway signaling. In developing means of control over railway trains, a complex system of signaling has been evolved. Here, as in the marine service, colored lights are employed for night signaling. A superficial consideration of certain defects of color vision has inspired the fear that this method of signaling is a menace to public safety. It is to be noted, however, that the objector has brought forward no evidence to show that his objection has any other than a purely fictitious foundation. Nor is it difficult to determine that the alarming conditions which he has conjured up have no counterpart in the practical affairs of railway operation. Railways, the world over, make use of colored signals; and the governments of several countries publish statistical reports of the numbers, the fatalities and the causes of railway wrecks. Now, such a country as England furnishes ideal conditions for a crucial test of the efficiency of the present system of signaling, because the English railways have to cope with an unusual combination of adverse conditions of operation,—congestion of traffic, high speed of trains, and the prevalence of fogs. Yet the English railways are noted for the infrequency of their accidents. Their fatalities have averaged so low as one per one hundred and sixty-nine millions of passengers carried; and a full year has elapsed without a single fatality. These data refer to accidents *from all causes*; and a commission recently appointed by the Royal Society reports that no accident, railway or marine, can be traced to anomalous conditions of color vision. Practical experience then shows that colored lights constitute a safe means of signaling, and that their results are in the highest degree successful even when the conditions of operation are relatively unfavorable. Is it not clear that if railway disasters are more frequent in America the cause is to be sought elsewhere than in a defective system of signaling? The Inter-State Commerce Commission (America) reports great numbers of railway disasters which may be traced to disobedience and drowsiness of employees, to defective road-bed and rolling stock, to obstructions upon the track, to the American tendency to take hazardous risks, etc. And the reader who cares to consult the Commission's reports will find that these are the causes to which the lesser safety of railway travelling in America must be ascribed.

Although we are now in possession of a goodly accumulation of facts regarding the phenomena of abnormal color vision, there are still a number of points upon which additional light is desirable. Certain technical problems still remain unsolved: What is the relative distribution of spectral brightness in normal and abnormal color systems? What is the relation of lenticular and macular pigmentation to variation from normal color vision? What are the mutual relationships of 'color weakness,' anomalous trichromatism and normal color vision?

If, however, some beneficent magician should grant the boon of an answer to but a single question, the investigator would undoubtedly demand to know just what is the character of the sensations which are possible to the abnormal. If we had a perfect description of the color systems of the various types of abnormality, few obstacles would remain in our path. Then we should be prepared to give a definite answer to the general question: Do these various types of abnormality represent a continuous series of gradations, without interruption or lacuna, between normality and complete color-blindness? Indeed, the suspicion is gaining ground that even this most extreme form is not a color-blindness at all, in the literal sense of that term. There seems reason to believe that at least the color system of the typical red-green blind contains red and green sensations; and that he may distinguish between red and green if only the stimuli be presented under sufficiently favorable conditions. Whether the hypothesis of continuous gradation, or the hypothesis of isolated types will ultimately dominate our envisagement, remains for the investigator of the future to determine.

## PSYCHOLOGICAL LITERATURE.

### THE WÜRZBURG MEETING OF EXPERIMENTAL PSYCHOLOGISTS.

The report of the proceedings of the second *Kongress für Experimentelle Psychologie* makes a pretentious volume.<sup>1</sup> The sessions extended over four days; and they were attended by upwards of one hundred and fifty persons. The meetings were organized by Professor Oswald Külpe, and presided over by Professor G. E. Müller. A novel feature which was introduced at these sessions was the presentation of a number of *Referate* upon assigned topics. The subjects reviewed were as follows: Experimental *Aesthetics*, by Professor O. Külpe; Feeble-Minded Children, by W. Weygandt; Individual Psychology and Psychiatry, by R. Sommer; The Psychology of Reading, by F. Schumann; Experimental Phonetics and Psychology, by F. Krueger. The summaries of the papers presented at the meetings fill a volume of 266 pages. It will be impossible for the reviewer to do more than to indicate briefly the content of the more important contributions.

#### I. APPARATUS.

Dr. K. Marbe demonstrated an apparatus for brief visual stimulation. It may be employed in connection with a projection lantern, and is adapted for use in large auditoriums.

Dr. F. Krueger demonstrated a laryngographic speech recorder. This apparatus has a wide range of utility, and possesses numerous advantages over other forms.

#### II. GENERAL.

F. KRUEGER. *The Relation of Phonetics to Psychology (with a demonstration of the Krueger laryngograph)*. Pp. 58-122. Krueger gives a lengthy review—with 125 bibliographical references—of the history of the problems of experimental phonetics, and a detailed description of the present status of the science. Inasmuch as speech is the product of an expressive movement, it stands in intimate relation with the phenomena of mind. It is impos-

<sup>1</sup> F. Schumann, *Bericht über den II. Kongress für Experimentelle Psychologie*. Leipzig, J. A. Barth, 1907. Pp. xviii + 266. Nine Marks.

sible to draw a sharp line of demarcation between phonetics and psychology — a fact which is recognized by the modern investigators of phonetics. An accurate analysis of speech variations is of fundamental importance in phonetic investigations. The author demonstrated a laryngograph which gives a kymograph tracing of speech movements. It is impossible here to summarize this valuable paper of more than sixty pages.

STANISLAUS KOBYLECKI. *Psychological Experimentation without Introspection.* Pp. 244-249. A defense of the thesis that introspection cannot be ignored in experimental investigation.

### III. SENSATION.

L. ASHER. *The Law of the Specific Sense Energies.* Pp. 213-214. The concept of evolution is in perfect harmony with the law of the specific sense energies. No sensation quality was evolved from another; each arose from a 'virtual energy' in complete independence from every other quality. (This paper appeared *in extenso* in *Zeit. f. Psy. u. Phys.*, Abt. II., XLI., 1906, 157 ff.)

AUGUST KIRSCHMANN. *Darkness in the Domain of Light.* Pp. 224-229. The reader is referred to the author's own statement.

E. DETLEFSEN. *Farbenwerte und Farbenmasse.* Pp. 235-236. The relative brightnesses of colors may be compared and expressed quantitatively by means of a graded series of grays. Color filters aid in the analysis of mixed colors.

O. VERAGUTH. *The Galvanic Psycho-physical Reflex.* Veraguth finds that if a constant electric current be passed through the body, the galvanometer registers certain characteristic variations. This change in the conductivity of the body he calls the 'galvanic psycho-physical reflex.' There are characteristic curves of oscillation for repose, for stimulation, for expectation and for verbal association. And each oscillation is preceded by a period of latency, of several seconds duration, which elapses between the mental change (sensation, repose, etc.) and the change in bodily conductivity. The author confesses his inability to explain these phenomena; but by a method of exclusion he rules out various tentative hypotheses. Jung and Elsenhans discussed the author's finding, — the former contributing results of his own investigations of the topic.

W. SPECHT. *The Divergence of Difference Limen and Stimulus Limen as a Result of the Use of Alcohol.* (With discussion.) Pp. 194-199. The author's more extended presentation of his results is reviewed elsewhere in this issue. (See p. 311.)

## IV. AFFECTION, EMOTION.

Oswald KÜLPE. *The Present Status of Experimental Ästhetics.* (With discussion.) Pp. 1-57. The author traces the historical development of aesthetic investigation from the pioneer work of Fechner, pointing out certain phases of the evolutionary process which have been common to experimental aesthetics and to experimental psychology. His treatment deals with the methods, and the results and theories. In the discussion of the results his attitude is so uncritical as to render his statement of doubtful value. He considers, in order, the investigations with colors, with spatial forms, with rhythms and rhymes, with the comic, with the plastic and graphic arts, and with music. The classification and description of methods is a valuable contribution to the literature. The classification is as follows:

- I. The methods of impression.
  - a. Methods with constant impressions.
    - 1. Method of single choice.
    - 2. Method of manifold choice.
    - 3. Method of seriation.
    - 4. Method of paired comparison.
  - b. Methods with variable impressions.
    - 1. Method of continuous change.
    - 2. Method of time variation.
  - c. Methods of simple description.
    - 1. Method of free description.
    - 2. Method of restricted description (questionnaire and comparison methods).
- II. The reproduction methods.
  - a. Reproduction of the most pleasing elements, relations and arrangements of a given material.
  - b. Reproduction in accordance with a pattern.
  - c. Real production.
- III. The methods of expression.
  - a. Registration of pulse, breathing, volume.
  - b. Recording of mimetic and pantomimetic phenomena.
  - c. Registration of movements and movement-tendencies of the limbs.

The reader cannot but be struck by the paucity of result yielded by the experimental investigation of this topic; but, as the author points out, there has, at least, been developed a technique which gives promise of achievement in the future.

H. HUGHES. *The Theory of the Emotions.* Pp. 230-231. A discussion of the dramatist's treatment of the emotions.

C. STUMPF. *Ueber Gefühlsempfindungen.* (With discussion.) Pp. 209-213. There are good reasons for believing that the feelings

are neither attributes of sensations, nor yet a second sort of mental process which is in some way connected with sensation. There seems to be a certain justification for regarding them as concomitant sensations which are super-added to the more independent sensations in whose company they come to consciousness. This conception aroused an active discussion in which Ebbinghaus, Jerusalem and others took part.

#### V. PERCEPTION.

E. V. ASTER. *The Psychology of the Perception of Space.* Pp. 260-263. A most naïve 'contribution to the psychological analysis of the immediately experienced impression of depth.'

HANS RUPP. *The Localization of Tactual Stimuli with Different Positions of the Stimulated Member.* Pp. 231-232. The problem was: What effect has a change of posture of the arms, hands and fingers upon the localization of stimuli applied to digital regions? The investigation was, however, confined to the temporal relations of the localizations. It was found that, when his arms are extended in front of his body, an observer is able to localize digital stimuli more rapidly than when his arms are folded. The average increase of time corresponding to the latter posture is about eleven per cent. A striking feature of Rupp's results is the fact that the localization-time for different digital regions varies between wide limits—being greatest (1019 sigma) for the second finger and least (455 sigma) for the thumb. This variation the author does not attempt to explain; but the slower localization with folded arms he refers to the fact that the (visual?) image of the hands in the normal uncrossed position tends to come to consciousness more readily, and to inhibit the image of the crossed posture. The paper appears *in extenso* in the *Zeitschrift f. Sinnesphysiologie*, XLI.

#### VI. ATTENTION AND WILL.

WILHELM WIRTH. *The Distribution of Attention in the Different Sense Departments.* Pp. 236-243. A continuation of an investigation reported upon at the Giessen Congress. What effect has the distribution of the attention upon the apprehension of sensory impressions? The author's method consisted in determining the difference-limen for tactual, auditory and visual sensations—an improved form of projection perimeter being employed for the latter determinations. Then he instituted a comparison between differential limina obtained (a) when the attention is concentrated upon the stimulus, (b) when the attention is concentrated elsewhere, and (c) when

the attention is diffused. His results show that the capacity to detect a variation of intensity of sensation is but slightly impaired by a distribution of the attention, and that the amount of impairment is approximately constant and uniform for the different sense departments.

NARZISSE ACH. *Experimental Investigation of the Will.* Pp. 251-257. This too is a supplementation of a research presented by the author at the Giessen Congress. Ach's present paper deals with a quantitative and qualitative investigation of voluntary acts, with a view to discovering what is the mode of origin of the resolve (*Entschluss*). He employed a method which consisted in a combination of the *Treffermethode* and the reaction-time experiment. Series of nonsense syllables were presented visually. Certain series consisted of unrelated syllables; others were made up of successive pairs of rhyming syllables; while a third series consisted of pairs of syllables containing transposed consonants (sud, dus). These series were learned thoroughly — each being presented eighty times, and the presentations being distributed over seven days. In the second part of the investigation, a syllable chosen at random was re-presented to the observer, and a definite task was assigned him. Thus, if a syllable from an unrelated series were chosen, the observer was required to give, not an associated term from the same original series, but to give either a syllable which rhymed, or the transposed form. The introspections and the association-times were recorded. Ach points out that inasmuch as his observers were required to break down established associations by an act of will, his records furnish both a qualitative analysis of the content, and a quantitative determination of the strength of the will-consciousness. It is impossible to summarize his results in brief compass.

E. DÜRR. *Voluntary Action and Association.* Pp. 249-250. Dürr objects to the conceptions of voluntary action which have been advanced both by the Associationists and by the Voluntarists. In opposition to these he formulates a definition of his own, which the reviewer will not attempt to render into polite English. "Unter Willenshandlungen sind die durch psychische Vorgänge oder solchen korrespondierende Prozesse im Zentralorgan bedingten, eine bestimmte Erwartung erfüllenden Lebensäußerungen zu verstehen."

## VII. MEMORY AND ASSOCIATION, ETC.

W. JERUSALEM. *Remembering and Forgetting.* Pp. 199-203. A description of two personal experiences. The first deals with 'associative and apperceptive transformations' of remembered material,

and suggests a promising point of attack upon the problems of memory. The second deals with the forgetting of a familiar book-title with which an unpleasant incident was associated. The second incident is cited in support of 'a theory of forgetting which heretofore has not received sufficient attention.'

STEPHAN WITASEK. *The Measurement of Memory.* Pp. 202-203. The author's new method is a combination of the 'saving' method and the 'prompting' method. A scale of relative values for the various types of error is proposed. Discussion by Cohn, Lipps and Wirth.

F. SCHUMANN. *The Psychology of Reading.* Pp. 153-183. An extended survey of the literature of this problem.

L. PFEIFFER. *A Method for the Determination of Qualitative Work-types in the School-room.* Pp. 203-207. An analysis of themes submitted by children reveals the existence of typical differences. Pfeiffer distinguishes eleven typical modes of working (descriptive, memorial, inferential, etc.), and numerous pure and mixed types of work.

C. DECROLY. *The Measurement of Intelligence in Normal and Abnormal Children.* Binet's method (physical measurements) is unsatisfactory. Intelligence must be regarded as capacity for adaptation and accommodation; and from this point of view there must be worked out a means of measuring mental functions.

### VIII. JUDGMENT, BELIEF.

OTTO LIPMANN. *The Effect of Suggestive Questions.* Pp. 207-209. The author prepared a series of questions whose formulations were suggestive and prejudicial. These were answered by upwards of twelve hundred children and the replies were compared with answers to non-suggestive questions. The types of suggestion employed were: false assumptions, imperfect disjunctions, true and false anticipations. The answers show that questions involving false assumptions and imperfect disjunctions have a greater suggestive power than questions involving false anticipations, that boys are more suggestible than girls, and that suggestibility decreases with increase of age and of training.

AUGUST MESSER. *An Experimental Investigation of the Judgment.* Pp. 258-260. Messer's problem is: What introspective account of the act of judging can be obtained from the trained observer? The author's discussion indicates that, however difficult to lay hold upon and to describe its essential characteristics, this act is

an experience *sui generis*. His observers drew a sharp distinction between mere association and the experience which they called judgment. In this distinction it is not of decisive importance whether the copula precede the substantive or adjectival reaction-word, or whether the reaction-word can be apprehended as a statement regarding the stimulus-word. The reaction is designated as a mere association when the observer is conscious of its automatic or arbitrary character (*e.g.*, when he feels that he could quite as well have replied with any other word). But it is designated as a judgment when he is conscious of having himself related the reaction-word with the stimulus-word. This act of relating is reported to consist in 'catching them together in the focus of consciousness.'

K. BÜHLER. *An Analysis of Complex Processes of Thought.* Pp. 263-266. The procedure consisted in having trained psychologists furnish an introspective analysis of their complex processes of thought. With an introductory 'Do you accept this?' or 'Do you understand this?' an aphorism was read to the observer. As soon as he was able to answer yes or no, he proceeded to give an introspective analysis of the group of experiences which culminated in his answer. Bühler reports that among the component parts of these experiences are to be found ideas of all sorts, and from all departments of sense; but, in addition to these, one finds other contents which are variously designated: thoughts, *Bewusstseinslagen*, *Bewusstheiten* (Marbe, Ach), knowledge, conviction. Bühler therefore distinguishes two sorts of content as present in these experiences: ideas and thoughts (*Gedanken*). The latter he attempts to describe. They are the real components of our thinking; they cannot however be characterized by quality, intensity and the like as ideas can. In thoughts we must rigidly distinguish that sort of *Bestimmtheit* which might be called *Gegenstandsbestimmtheit* (Husserl, Lipps) from that which is given us perceptually (*anschaulich*) in our thinking. Then in order to account for these *Gegenstandsbestimmtheiten* he assumes the existence of a third mental element or function, which he designates *Wissen* and which serves as the substrate of the *Gegenstandsbestimmtheit*. The author of this paper is convinced that his discussion will serve to clear up many of the controverted points of psychology; the reviewer cannot share his optimism.

#### IX. ABNORMAL PSYCHOLOGY.

W. WEYGANDT. *The Psychological Investigation of Feeble-minded Children.* Pp. 123-135. A review of the literature, and a plea for improved conditions for a continuation of the work.

R. SOMMER. *Individual Psychology and Psychiatry*. Pp. 136-152. The author's chief aim is to discover what, if any, relation obtains between an individual's form of mental disorder and his previous psychical disposition and temperament. He asks two definite questions: In how far may the traits of earlier normal character be observed in the symptoms of the later psychosis? And, to what extent are the peculiar characteristics of the normal individual, at bottom, pathological? In an attempt to answer the former question he discusses, in order, the symptoms of a variety of mental diseases, pointing out the presence or absence of a correlation between pre-neurotic and post-neurotic dispositions and temperaments. While he succeeds in establishing the correlation in certain instances (alcoholism, the neurasthenic depressive form of progressive paralysis), he usually fails to find any evidence of its existence. He urges a coöperation between clinical observation in psychiatry and experimental investigation in psychology, and looks forward to the day when we shall have a medical psychology based throughout upon the results of psychological investigation. Sommer's paper was discussed by Lipps and Neisser.

J. W. B.

#### TEXT-BOOKS.

*Elementary Experiments in Psychology*. CARL E. SEASHORE. New York, Henry Holt and Company, 1908. Pp. xi + 218. With envelope of colored papers.

"This manual is designed to meet the requirements for a series of individual experiments in the first course in psychology. It makes individual experiments, as opposed to class demonstrations, practicable, regardless of laboratory facilities or the size of the class. The student is given means and encouragement for pursuing each problem intensively in order that he may acquire independence of thought and action, realize the actuality of mental processes, and get here and there a vision of the vastness, the orderliness, the practical significance, and the charms of mental life.

"No laboratory facilities are required. In this there is a triple gain: it saves the manifolding of equipment, it frees the student from the technicalities incidental to the manipulation of apparatus at a time when his energies need to be conserved for the grasping of the psychological problem, and it saves time for the class period, the experiments being adapted for outside assignments. The apparatus other than that ordinarily at the disposal of students is supplied with the book in the accompanying envelope.

"This is not a laboratory manual. It is a manual of experiments which the student should perform before he is admitted to the laboratory, or in case he does not intend to pursue the subject beyond one course."

With these introductory words Professor Seashore explains the plan and scope of his book. The experiments are designedly of an elementary character; they are well adapted to serve as a substitute for the less satisfactory class-demonstrations, and to equip the student with some degree of pre-laboratory training.

The experiments are judiciously selected. And, what is better, they are described in terms which can scarcely fail to be thoroughly understood by the average undergraduate. Moreover, the significance of the various forms of mental function is discussed in a manner which is calculated to stimulate the interest of the student.

After a brief Introduction addressed to the student, the author gives directions for a series of experiments dealing with visual sensation (Visual After-Images and Visual Contrast). The third chapter treats of the exploration of the visual field, and paves the way for Visual Space which in turn is followed by Auditory Space and Tactual Space. Next in order come Cutaneous Sensations and Weber's Law. The reviewer would suggest that at least the former member of this pair should have preceded the perception experiments; but he is well aware that all American psychologists do not defer the problems of perception until sensation has been worked over. The remaining chapters deal with Mental Images, Association, Memory, Apperception (the meaning-tendency, bias, subjective grouping, reversible perspective), Attention, Normal Illusions (of visual space), Affective Tone, and Reaction Time.

Just so long as local conditions and individual ideals in university communities differ, there must be variations in the current methods of presentation of subject-matter. Certain universities have found it impossible to keep pace, in quarters and equipment, with the rapidly increasing student body; and others have found themselves facing the problem of how to teach a modern system of psychology with no laboratory at all. It is in such situations as these that Professor Seashore's book will prove to be most useful. And the reviewer can readily understand how it will prove to be a boon to many American psychologists.

J. W. B.

*La Psychologie Quantitative.* J. J. VAN BIERVLIET. Gand, A. Siffer, and Paris, Félix Alcan, 1907. Pp. 219. Also *Revue Philosophique*, 1907, Vol. 63, pp. 1-32, 140-175, 561-592; Vol. 64, pp. 561-587; Vol. 65, 1908, pp. 48-70.

The author distinguishes three phases in the development of psychology, which he calls psychophysics, physiological and experimental psychology. The exponent of psychophysics, the science of the exact relation between mind and matter, is Fechner. The data on which Fechner based his psychophysical law and a short review of the various discussions and criticisms of this law are given. The fundamental error of psychophysics is found in the view that sensation is something comparatively simple, and that the chief interest lies in the metaphysical problem how the mind acts on the body. To this comes the eagerness of the psychophysicists to find exact mathematical formulæ, for which purpose they try to make the physical conditions of the experiments as uniform as possible but fail to take the psychical disposition of the subject into proper consideration. This neglect of individual differences fostered the belief that results obtained from a few subjects are sufficient, and the small number of the subjects used is one of the chief reasons for making these results unacceptable.

The representative of physiological psychology is Wundt. The author discusses in this chapter almost exclusively the experiments on reaction time, association time, etc., of Friedrich and of Trautscholdt. On the whole the criticism of physiological psychology is more favorable than that of psychophysics, although the author objects to the small number of subjects and sees in the results more the promise of future discoveries than actual achievements. Physiological psychology, however, will always find its progress blocked by insurmountable difficulties, because it is burdened with metaphysical notions, as, e. g., the concept of apperception.

Under the title of experimental psychology investigations on very different problems are described, such as Saint-Paul's questionnaire on the 'formule endophasique' and Friedrich's investigations on the quality of mental work of school children at different hours of the day and the effect of the length of classes and of recreations. The author mentions the experiments on memory by Münsterberg and Bigham, by Smith and by himself and gives an account of Binet's work on arithmetical prodigies (Inaudi) and of Toulouse's study of Zola. The last pages are devoted to the description of what the author considers the final method of psychology. Experiments on a

large number of subjects give results obtained under conditions which are not well defined and only incompletely known, whereas laboratory experiments are carried on under better conditions but suffer from the small number of subjects used. The problem is to combine, if possible, the advantages of both methods. The evolution of psychological methods thus arrives at the problem of analyzing the psychical traits of a mass so as to make intercomparison possible. For this purpose a system of psychical units such as that of Toulouse, Vaschide and Pieron is needed.

The text of the book differs from that of the articles of the *Revue Philosophique* only in words at very few places. One recognizes easily the author's predilection for what he calls experimental psychology, a predilection which shows itself also in the presentation of psychophysics and of physiological psychology. It gives, for instance, most decidedly the impression of the author's intention to criticize or to find fault, when he objects to Fechner's experiments on lifted weights, because they were not made on a large number of subjects. The attempt to show the little agreement between Weber's Law and the data on which it actually was based, is interesting although this fact is well known. At some places it appears as if the author connected a somewhat erroneous idea with the meaning of this law, as, e. g., when he points out that the ratios vary from subject to subject. In the description of physiological psychology the author quotes from the French translation of the 'Physiologische Psychologie' which appeared in 1886, and in his discussion of psychophysics none of the investigations which were carried on after Fechner is mentioned. For these reasons one must say that Van Biervliet's discussions of psychophysics and of physiological psychology in so far as the present state of the problems is concerned are, at the best, inconclusive.

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#### PSYCHOPHYSICAL EFFECTS OF ALCOHOL.

*Die Beeinflussung der Sinnesfunktionen durch geringe Alkoholmengen. I. Teil. Das Verhalten von Unterschiedsschwelle und Reizschwelle im Gebiet des Gehörsinnes.* (Preisgekrönte Arbeit.) WILHELM SPECHT. Leipzig, Engelmann, 1907. Pp. 115, with 16 figures.

The methodological bearings of this paper have been discussed in an earlier issue of the BULLETIN (Vol. V., pp. 84-88).

Specht finds that the use of alcohol is invariably attended by a

characteristic change of sensory function; and that this change is cumulative, increasing in magnitude and in rapidity with subsequent doses of the drug. The variation in sensitivity follows a characteristic temporal course, increasing gradually from a small magnitude within a few minutes after administration, reaching its maximum in about thirty minutes, and then as gradually waning until the end of an hour, when it has almost or wholly disappeared. In every instance, *alcohol raises the difference limen, but lowers the stimulus limen* — that is, it refines one's capacity to detect a barely audible noise, but blunts one's capacity to discriminate between noises of different intensity. The variation of the difference limen manifests itself chiefly in an increased number of judgments of equality, although there is also a slight increase in the number of erroneous judgments. It seems impossible to give the reader an adequate insight into this remarkable state of affairs, or to depict the uniformity of the author's findings without reproducing excerpts from his tabulated results. Both observers whose results are here quoted have been total abstainers for upwards of ten years; the reviewer has taken the liberty of reducing the average results to a per-centual basis. Table XXIV. shows the daily distribution of correct judgments ( $r + g/2$ ), with and without alcohol, in the determination of the stimulus limen; Table II. shows the analogous results in the determination of the difference limen. The reader cannot fail to be struck by the fact that the dose of alcohol

|                         | Day.   | Normal Experiments. |    |    |    |    |    |    |    |    |    | Experiments with Alcohol. |    |  |  |
|-------------------------|--|---------------------|----|----|----|----|----|----|----|----|----|---------------------------|----|--|--|
|                         |  | 1                   | 2  | 3  | 4  | 6  | 8  | 10 | 12 | 5  | 7  | 9                         | 11 |  |  |
| Table XXIV.<br>(p. 82). | STIMULUS LIMEN.<br>Per cent. of Correct Judgments.       | 59                  | 56 | 62 | 56 | 73 | 66 | 66 | 63 | 85 | 83 | 83                        | 84 |  |  |
| Table II.<br>(p. 34).   | DIFFERENCE LIMEN.<br>Per cent. of Correct Judgments.     | 74                  | 77 | 77 | 78 | 77 | 74 | 83 | 85 | 70 | 70 | 70                        | 68 |  |  |
| Table III.<br>(p. 37).  | DIFFERENCE LIMEN.<br>Per cent. of judgments of Equality. | 20                  | 19 | 16 | 14 | 14 | 13 | 13 | 11 | 32 | 30 | 30                        | 32 |  |  |

TABLE XIII. (p. 54).

|                   | Minutes.                             | 4  | 8  | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 | 44 | 48 | 52 | 56 | 60 |
|-------------------|--------------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Difference Limen. | Normal Experiments.                  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|                   | Per cent. of Correct Judgments.      | 85 | 91 | 95 | 90 | 93 | 90 | 85 | 91 | 86 | 91 | 91 | 88 | 94 | 85 | 96 |
|                   | Experiments with Alcohol (20 c.cm.). |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|                   | Per cent. of Correct Judgments.      | 97 | 80 | 72 | 72 | 67 | 62 | 52 | 67 | 75 | 72 | 82 | 92 | 90 | 97 | 97 |
|                   | Normal Experiments.                  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|                   | Per cent. of Judgments of Equality.  | 10 | 13 | 13 | 0  | 6  | 3  | 6  | 3  | 0  | 6  | 6  | 6  | 6  | 10 | 6  |
|                   | Experiments with Alcohol (20 c.cm.). |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|                   | Per cent. of Judgments of Equality.  | 5  | 20 | 60 | 45 | 55 | 65 | 65 | 55 | 30 | 25 | 25 | 15 | 20 | 5  | 5  |

TABLE XXVIII. (p. 97).

|                 | Minutes.                             | 2.5  | 5  | 7.5  | 10 | 12.5 | 15 | 17.5 | 20 | 22.5 | 25 | 27.5 | 30 |
|-----------------|--------------------------------------|------|----|------|----|------|----|------|----|------|----|------|----|
| Stimulus Limen. | Normal Experiments.                  |      |    |      |    |      |    |      |    |      |    |      |    |
|                 | Per cent. of Correct Judgments.      | 54   | 62 | 54   | 57 | 52   | 55 | 51   | 57 | 59   | 54 | 50   | 64 |
|                 | Experiments with Alcohol (20 c.cm.). |      |    |      |    |      |    |      |    |      |    |      |    |
|                 | Per cent. of Correct Judgments.      | 52   | 57 | 67   | 72 | 77   | 80 | 85   | 97 | 100  | 90 | 97   | 92 |
|                 | Minutes.                             | 32.5 | 35 | 37.5 | 40 | 42.5 | 45 | 47.5 | 50 | 52.5 | 55 | 57.5 | 60 |
| Stimulus Limen. | Normal Experiments.                  |      |    |      |    |      |    |      |    |      |    |      |    |
|                 | Per cent. of Correct Judgments.      | 58   | 56 | 62   | 57 | 52   | 55 | 45   | 57 | 55   | 52 | 57   | 57 |
|                 | Experiments with Alcohol (20 c.cm.). |      |    |      |    |      |    |      |    |      |    |      |    |
|                 | Per cent. of Correct Judgments.      | 85   | 77 | 75   | 72 | 75   | 62 | 55   | 50 | 60   | 55 | 52   | 60 |

is followed, in the former case, by an increase and, in the latter case, by a decrease in the number of correct judgments. Table III. shows the extent to which the use of alcohol tends to a multiplication of judgments of equality in the discrimination experiments. Tables XIII. and XXVIII. show the temporal relations of the effects of small doses of alcohol. It will be noticed that the variation in differential sensitivity takes the form of a concave curve, with the lowest point of its trough coming twenty-eight minutes after the dose is administered. The variation in the stimulus-sensitivity takes the form of a convex curve, with the highest point of its crest extending from twenty to thirty minutes after the administration of the dose.

How is this contrary effect of alcohol upon the two forms of sensory function to be explained? Specht refers the impairment of discriminative capacity to a contraction of the compass of attention. He points out an analogy in the familiar fact that the normal individual, in a state of relative inattention, finds his capacity to discriminate between simple stimuli (such as clicks of a metronome) very much decreased. In such a state, the first impression has faded out before the second (comparative) impression comes in. Cf. Titchener's third law of attention. The introduction of this analogy does little more than emphasize the fact that discrimination is much more than mere sensation, and make it comprehensible why two such closely related functions should be affected in opposite directions by alcohol poisoning.

J. W. B.

### CUTANEOUS SPACE PERCEPTION.

*Les signes régionaux.* A. MICHOTTE. Travaux du laboratoire de psychologie expérimentale de l'Université de Louvain. Paris, Félix Alcan, 1905. Pp. 195. Six plates and numerous figures.

It is, of course, a familiar fact that different regions of the cutaneous surface possess different degrees of sensitivity. Not only do the limina of pressure, pain and temperature vary between fairly wide limits, but the different regions differ also in their capacity to detect the presence of two compass-points. In the monograph under review, Michotte deals with this latter phenomenon. The definite problem which he attacks is: What is the distribution of cutaneous sensitivity to dual impression?

His experiments have to do, almost exclusively, with aesthesiometry; and his explorations are for the most part confined to the palmar surface of the hand. He employs a slightly modified form of the von Frey compass-point aesthesiometer, and his procedure is essentially in accordance with the method of minimal changes. The work, which is a product of the psychological laboratory of the University of Louvain, consists of experiments carried through with nine observers.

The plan of the investigation was as follows: Upon each cutaneous region explored, he determined the limina of dual impression for a variety of directions radiating from a common center. In making these liminal determinations he first chose an arbitrary center and marked it by means of a dot of ink. Then the aesthesiometer was brought into contact with the skin in such manner that one point rested upon the ink-spot and the other upon a closely adjacent region.

The former point remained in contact with the ink-spot throughout the series—the other point meanwhile sliding across the surface of the skin until the observer was able to detect the presence of the two points. This procedure was repeated for various directions from the common center; and the result was a cutaneous map which marked the outline of the ‘æsthesiometric field.’ And the investigation consisted in determining the form and size of these fields for various cutaneous regions, and under various conditions of attention and distraction (adding, counting the strokes of a metronome). By ‘æsthesiometric field’ the author means simply ‘the area containing all of those points which were capable of being confused with the central point.’

It was found that, in explorations made without distraction, the ‘æsthesiometric fields’ are relatively small and constant in size and relatively regular and uniform in shape (circular or elliptical). When the observer’s attention is distracted, however, a most interesting and significant phenomenon appears. The fields expand, and their boundaries become exceedingly irregular in outline. Certain parts of the boundaries may assume a rectilinear or even a concave form. But in no case can they extend beyond one of the prominent cutaneous folds of the palm, or of the digital joints. Just so soon as one point of the æsthesiometer passes a prominent fold of the skin, the observer is immediately aware of a duality of impression, no matter to what degree he be distracted (within the limits of the distractions employed in the experiments). It is possible to map out well-marked boundaries of five of these larger ‘æsthesiometric fields’: the fusiform region, the thenar eminence, the hollow of the palm, the round eminence and the hypothenar eminence. In addition to these, the cutaneous region corresponding to each phalanx of the fingers and thumb also constitutes a separate ‘æsthesiometric field.’ The author assumes that each of these ‘fields’ possesses its own peculiar tactal quality, in consequence of which the discrimination of dual impressions becomes possible. This system of qualitative criteria, which may be regarded as ‘local signs of the second order,’ he calls ‘regional signs.’ He shows that there is an intimate relation between regional signature and bodily movement. Every field which possesses its own ‘regional sign’ constitutes a mobile unit of the hand: we have just as many ‘regional signs’ as we have mobile segments. That every part of the hand which is capable of changing its relative position should possess its own local distinguishing-mark, and that even in a state of relative inattention we should be incapable of confusing these distinguishing-

marks with one another is significant. That these findings furnish yet another confirmation for one of the current theories of space-perception need scarcely be pointed out. And this confirmation becomes even stronger when we remember that the distribution of 'regional signs' is not of such a pattern as one would expect from the anatomical distribution of nerve-supply in the hand.

J. W. B.

### BOOKS RECEIVED FROM JULY 5 TO SEPTEMBER 5.

*La dynamique et les trois âmes.* J. PAUL MILLIET. Paris, E. Sansot & Cie, 1908. Pp. 389.

*A History of a Strange Case.* DAVID P. ABBOTT. (Reprinted from the Open Court for May and June, 1908.) Chicago, Open Court Publ. Co., 1908. Pp. 50.

*American Science Series. Ethics.* JOHN DEWEY and JAMES H. TUFTS. New York, Holt & Co., 1908. Pp. xiii + 618.

*Das Seelenleben des Kindes. Ausgewählte Vorlesungen.* KARL GROOS. 2d ed. Berlin, Reuther & Reichard, 1908. Pp. 626. Mk. 4.50.

### NOTES AND NEWS.

THE present number of the BULLETIN, dealing especially with experimental psychology, has been prepared under the editorial care of Professor J. W. Baird.

MR. ARTHUR UPHAM POPE, of Harvard University, has been appointed instructor in philosophy at Brown University.

THE following are taken from the press :

THE degree of D.Sc. *honoris causa* was conferred on Professor James Ward at Oxford, on June 24.

DR. SIDNEY E. MEZES, professor of philosophy at the University of Texas, has been elected president of the University, to succeed Dr. D. F. Houston, who recently resigned.

PROFESSOR ALFRED EDWARD TAYLOR, of McGill University, has been appointed to the chair of moral philosophy at the University of St. Andrews.

**THE**

# PSYCHOLOGICAL BULLETIN

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## HEDONIC EXPERIENCE AND SENSATION.

BY PROFESSOR HOWARD CROSBY WARREN,

*Princeton University.*

The conflicting definitions applied to 'feeling' and its cognate terms (affect, hedonic tone, etc.) make it difficult to sift the evidence concerning this phase of experience.<sup>1</sup> Beneath the terminological dispute there is a real difference of conception as to the place that hedonic phenomena should occupy in our scheme of psychological data. Is feeling a type of experience *sui generis*, something radically distinct from the experience due to external stimulation? Is it a distinctive but inseparable element of experience in general? Is it to be regarded as merely an aspect of sensation? Or, finally, is feeling but another name for a certain particular sort of sensation? According to one view feeling is coördinate with sensation. According to another, the hedonic or affective element of experience is coördinate with the presentative and with the conative. According to a third view feeling (hedonic tone) is coördinate with intensity, quality, and other characters of sensation. While according to a fourth, feeling is coördinate with vision, hearing, and other fundamental varieties of simple experience.

These conflicting classifications rest primarily, not on differences of opinion concerning the nature and scope of the 'feeling' phenomenon itself, but rather on different estimates of the *relation* between two sorts of psychological data: experiences (or factors) resulting from external stimulation, and experiences (or factors) of pleasure, displeasure, and the like. The task of fitting kinæsthetic data, interest, and other experiential facts into the scheme no doubt compli-

<sup>1</sup> See 'The Feeling Problem in Recent Psychological Controversies,' by C. H. Johnston, PSYCHOLOGICAL BULLETIN, V., p. 65; cf. Miss Calkins' discussion in the present number, p. 340.

cates the problem. But the crucial question to settle, first or last, is whether or not we must recognize some sort of fundamental bifurcation in consciousness.

Without laying too much stress on the canon of simplicity, I believe we should require very cogent grounds before introducing this complexity into our treatment of simple experience. The first view above mentioned makes the relation between visual and auditory experience something different from the relation of either of these to feeling; it is one degree 'closer.'<sup>1</sup> The second view, while insisting on the union of feeling and presentative elements in every experience, adopts the same hierarchical conception.<sup>2</sup> Both of these views result in a separation of the discussion of sensation from that of feeling, such as is found in most of our current text-books. The third view makes feeling a distinct *quale* of sensory experience, finding in vision, for example, both a series of sensation tones (colors) and a pair of hedonic tones (pleasantness-unpleasantness).<sup>3</sup>

The fourth view avoids all this complexity; it identifies hedonic consciousness with experience resulting from certain modes of organic stimulation, and regards all experience as being 'at bottom' of one sort.<sup>4</sup> The distinction of visual, auditory, hedonic and other sorts is regarded as a genetic growth, appearing gradually with the growing complexity of the biological organism. Hedonic experience is only one instance of differentiation among the rest. The presence of feeling elements in an experience which is mainly visual (for example) is explained as the result of association — the visual stimulus producing indirect hedonic effects at the same time that it yields the direct visual effects.

Those who deny this solution advance several arguments in support of a fundamental bifurcation of experience: Introspective evidence; physiological evidence connected with the source of experience (stimulation); physiological evidence on the reactive side; genetic evidence

<sup>1</sup> See Wundt, *Grundriss* and *Grundzüge* (latest editions), Külpe, *Grundriss*, Ebbinghaus, *Grundzüge*, Jodl, *Lehrbuch*; among English works Dewey, *Psychology*, Baldwin, *Handbook*, Ladd, *Descriptive Psychology*, Sully, *Human Mind*.

<sup>2</sup> See Höffding, *Psychologie*.

<sup>3</sup> See Stout, *Manual* and *Groundwork*, Judd, *Psychology* (where the term *feeling attitude* is used), and Wundt in his earlier editions. Titchener, *Outline*, and Calkins, *Introduction*, make affection subordinate to sensation, but discuss the two separately.

<sup>4</sup> James, *Principles and Psychology*, uses the term *feeling* almost synonymously with consciousness; he discusses all simple forms of experience under the head of sensation, and may be claimed as an exponent of this view. See also Thorndike, *Elements*.

from the development of experience. Each of these claims has force, even though they are not altogether mutually consistent. Nevertheless I believe them insufficient to justify the assumption, which the authority of tradition has served to strengthen unduly. In the present brief discussion I will not attempt to examine the positions of individual writers, but will only suggest some objections to the different lines of argument.

1. *Introspective Evidence.* — It is claimed that the hedonic experience is 'immediately and indubitably recognized' as something utterly distinct in character from visual experiences and other 'sensations.'<sup>1</sup> Now, granting that there appears an immense difference of sort between an experience of pain (or pleasure) and a visual experience, is there not also an immense difference of sort between a red light and the tone c<sup>2</sup>, or between either of these and the odor of camphor or a tickling touch? If we are to rely on introspection, I do not believe, on the ground of my own introspection, that the difference between so-called external sensations and so-called feelings is any more radical than the difference between certain external sensations. I can picture the transformation, by imperceptible degrees, of blue into red, since I have actually experienced such a transformation. I am unable to picture the transformation, by imperceptible degrees, of blue into camphor-odor, because I have never had any experience at all analogous to this. Yet with the aid of scientific imagination I can conceive of such a transformation having slowly taken place in the history of living organisms; and it requires no greater imagination for me to conceive of a similar transformation from a contact-experience to an enjoyment-experience. If in classing the different forms of simple experience the term 'sensation' be restricted so as to exclude the 'feelings,' it should not be on the ground of introspection. The most 'radical' separation discovered by self-observation is between the data of the different senses.

2. *Physiological Evidence from Source of Experience.* — It is claimed that there is a radical distinction between experience data resulting directly from external stimuli and data due to organic influences. Passing over the question of 'pure sensations' and 'pure feelings,' all ordinary experiences certainly claim a two-fold source. On the basis of origin, then, we may very properly regard the 'hedonic tone' of a sensory experience as something distinct from the characters that are due to the titular stimulus.<sup>2</sup> The pleasurableness of a visual experi-

<sup>1</sup> See Ladd, *Outlines of Descriptive Psychology*, p. 89.

<sup>2</sup> The position taken by Titchener, Calkins, and others in respect to affection in general.

ence is something different from its color. But observation and experiment alike go to show that there is just as determinate a physical basis for the former as for the latter. The hedonic tone is due to organic conditions, to some sort of *organic stimulation*. It is true that organic stimuli are usually not so definite and clear-cut as external stimuli; and the resulting contributions to experience are consequently more vague and ill-defined, except in certain cases. But is definiteness an adequate criterion? Every sensation near the threshold is vague and indefinite, yet it is the direct result of external stimulation.

The extreme definiteness of physical pain (*Schmerz*) has made it necessary to transfer this experience, formerly regarded as the prototype of all feeling, to the category of sensation. But is the *quale* of physical pain anything different from its 'hedonic tone'? And is the organic process which underlies physical pain really different from that which gives rise to any other hedonic effect? I think not. Affection has been defined as 'the conscious representative of the way in which the organism takes certain impressions.'<sup>1</sup> But does this mean more than that there is in most cases an indirect 'way' in addition to the direct 'way' of stimulation?

The two-fold aspect of feeling has been advanced as ground for distinguishing it from sensation. But whether two-fold or thrice two-fold (as Wundt suggests), this opposition is paralleled by the visual opposition of black and white, of blue and yellow, of green and its complementary.

Feeling, it has been urged, lacks a definite end-organ, and is therefore different from sensation. But end-organs and even nerve courses are lacking in primitive organisms. Even in the case of higher organisms the direct excitation of the optic nerve by an electric current gives rise to a visual sensation without the aid of the end-organ; and whether we regard hallucination as sensation or imagination may possibly be a matter of definition. What I contend is that it is *straining* our definition to place hedonic phenomena in a separate category merely on the ground of simplicity of physiological origin. If we are to use the term sensation in any *distinctive* way whatever, we are bound to apply it to experience arising from organic modes as well as to that arising from external stimulation.

Those of us who adopt the kinæsthetic theory of action treat the active life, so far as it is a phenomenon of experience, as a complex of muscle sensations, strain, and the like, arising from the activity itself. It is thus possible to divide simple experience into three

<sup>1</sup> Titchener, *Outline*, p. 213.

classes, according as it is based on one of three distinct sources: external stimulation, organic stimulation, and kinæsthetic stimulation. It seems a mere matter of terminology whether we restrict the term sensation to the first of these and find appropriate names for the other two, or make sensation the generic term and find appropriate names for its three species. In the one case we divide *experience* into sensations, feelings, and effort or active experience; in the other we divide *sensations* into external, organic, and kinæsthetic. Personally I prefer the latter terminology, since it indicates unmistakably the essential oneness of all the simpler types of experience. Sensation becomes equivalent to 'simple experience,' and is contrasted with complex experience of various sorts. This seems to accord better with the historic usage of the term sensation. It is, however, merely a matter of the use of terms. The real question is the relation of the three classes, and so far as physiological origin is concerned they appear to stand on the same footing and to be phenomena of essentially the same character.

3. *Physiological Evidence from Reaction*.—It may be claimed that 'feeling' and 'sensation' are fundamentally different because they afford distinct types of reaction. The complex phenomena of thought and emotion are not in question here, but only simple experience of any sort and the ensuing reaction. I do not know of any type of reaction attributed to feeling that may not also be found to result from sensory stimulation. Diffused reaction, simple muscular reflexes, movements of withdrawal and the opposite, prolongation and inhibition of activity, alteration of circulation, breathing, the secretions, and other automatic functions—all these have been assigned to 'hedonic' stimuli; but they all belong to external stimuli as well.

4. *Genetic Evidence from the Development of Experience*.—Our complex intellectual experiences suggest a fundamental distinction in their underlying elements according as the latter are capable or not of developing into the higher forms of intelligence. It is certainly true that sensations arising from external stimuli afford a better basis for discrimination, judgment, knowledge about things, than do the vaguer 'subjective' experiences of well-being, discomfort, etc. In nearly every experience one can distinguish a 'presentative' element, which leads to knowledge about the stimulus and about the world at large including our physical selves, and an 'affective' element, to which nothing in the external world seems to correspond, and which consequently leads to no such knowledge.<sup>1</sup> To some writers this appears

<sup>1</sup> See Baldwin, *Senses and Intellect*, pp. 36 (last paragraph), 84; Ward, art. 'Psychology,' *Encycl. Brit.*, 9th ed., Vol. XX., p. 67.

an adequate basis for assuming the radical dichotomy of experience.<sup>1</sup> My reason for rejecting the conclusion, while admitting the premises, is as follows:

The elements in experience which are wholly affective, non-intellectual, which lead to no 'knowledge about' the world, are always vague or at least indefinite. Whether internal or external, they afford no ground for comparison with other experience. In so far as *any* experience, external or internal, is definite enough to be compared with another, it can be termed presentative, in that it *does* lead to knowledge about the world—in that it is *something more than an isolated subjective phenomenon*. Thus if two pains, or two states of well-being, be compared as regards degree, and a judgment be formed, the affective states have become presentative. The supposed correlation between affective and internal arises from the fact that organic stimulation is more apt to give isolated, subjective experiences. The discomfort produced by a bright light yields us no additional knowledge about the nature of the light, because it is not due to the light at all. It is due to some organic stimulation and is an internal element added to the visual experience. It may or may not lead to knowledge. Ordinarily, being vague and indefinite, it will not; the visual elements in the experience, being definite, will form the entire basis of the ensuing perception. Organic sensations do not usually focus the attention; we do not correlate them with other experiences, nor compare them, nor experiment with them; they seem wholly to lack the 'presentative' character. The value of external stimuli in life and race history lies largely in our discriminating between them and reacting selectively as a result of this discrimination,<sup>2</sup> while internal stimuli are of value, rather, when they yield a direct reaction. Sensations of internal origin, then, are naturally 'affective'; but they are not always so.

The proposed distinction between presentative and affective really rests on the relative definiteness or vagueness of experiences. Definite, vivid experiences lead to perception, judgment, knowledge; indefinite, vague experiences lead to nothing beyond their own subjectiveness. The evolution of our intellectual life is based on the definiteness of the underlying simple experiences. And no one can say of any particular experience, however vague it be, that it might not later, in favorable circumstances, become focused in attention and form the basis of a perception, judgment, or act of discrimination.

<sup>1</sup> More generally a trichotomy; the conative element, however, is not here in question.

<sup>2</sup> Cf. Stout, *Manual*, p. 212.

It seems illogical, then, to divide simple experience into presentative and affective on the basis of intellectual value; because, while all intellectual experiences are by definition based on 'presentative' elements, not all apparently non-presentative elements are hopelessly non-intellectual.

Intellectual experience, I believe, is the result of a distinct mental or central function acting on favorable experiences of *any* sort; it is not the characteristic of a certain class of experiences. The action of this discriminative function is analogous to the action of the associative function.<sup>1</sup> Some sensations lend themselves more readily than others to grouping, fusion, and the formation of *complex* experiences. In like manner some sensations are more adapted than others to comparison, judgment, and the formation of *intellectual* experiences. But none are entirely incapable of associative or discriminative transformation; the result depends rather on the mental situation than on the nature of the sensation. On this view the terms presentative and affective have no genetic value whatever, and the distinction between sensation and feeling ceases to be fundamental.

*Conclusion.* — The view here advocated does not seek to eradicate any real distinction. Psychology should take full account of the distinction between sensations of 'external,' 'organic,' and 'kinæsthetic' origin, with reference to the very different bio-psychological phenomena to which they give rise. The complex phenomena of 'knowledge,' 'subjectivity,' and 'action' are essentially different; but their difference lies in the biological sphere rather than in consciousness. The primitive experience from which all complex experience has developed is of a single type, and the simplest experiences found in our own mature consciousness, however different, are of one 'sort.' Psychological analysis, then, should adopt the attitude of 'sensationalism' as regards the *elements* of experience. While to explain the *growth* of experience from primitive to higher differentiated types and from simple to complex forms it may be found necessary to assume several distinct processes.

<sup>1</sup> For a discussion of these factors see my article on 'Fundamental Functions of Consciousness,' PSYCHOLOGICAL BULLETIN, III., p. 217.

## PSYCHOLOGICAL LITERATURE.

### SPEECH.

*Principes de linguistique psychologique; essai de synthèse.* JAC. VAN GINNEKEN. Paris, Amsterdam, Leipzig, 1907. Pp. viii + 552.

This is a French translation of the Dutch edition (translator not the author, and unnamed) which appeared in the Leuvense Bijdragen 1904-06, and is to be welcomed as rendering more accessible a profoundly stimulating work. *Sprachpsychologie* has already grown into a science by itself. Linguists generally have not the psychological training to seek out the deeper causes of language-growth, and psychologists too often regard language as an external phenomenon, governed only by custom, convention and association of ideas. The author attempts to unite linguistic knowledge with psychological investigation, and to show that language is controlled *par excellence* by psychological forces. As being the expression, by human minds, of human meanings, it is essentially a psychological affair (p. iii).

Book I., 'The Representation of Words and Things,' analyzes verbal representations into four elements: representations of movement of the organs of speech, auditory, visual and graphic-motor representations.

Paul is wrong in regarding written language as nothing but a sign of spoken language; it is an end in itself (p. 16) and phonetics is here out of its depth (p. 17). Verbal representations are not the only terms of language, however: besides these real representations are 'potential representations' (pp. 28, 29), which, in the interests of economy, disappear from consciousness: *e.g.*, understanding the meaning of a word without any images being present. This explanation of imageless thought, though old, seems to us still good.

Not so good is the psychology of Book II., 'Intelligence and its Adhesions.' 'Adhesion' is used by the author to mean something like 'assentiment' (p. 54). "Adhesion contains the notion of that to which we adhere, plus the consciousness of its objectivity" (p. 54). One would at first think this the same as Bain's 'primitive credulity' or belief in the broad sense, yet the author cannot mean this, for he gives to nouns in a sentence one kind of adhesion, to verbs in a sen-

tence another kind, whereas we certainly, in uttering a sentence, believe it as a whole, without according a separate act of belief to its subject and its predicate. But it is hard to see just what else 'adhesion' can mean, after his definition above. Meinong's *Annahmen* seem to be ruled out, by his remarks on p. 69. We think that some statements regarding belief and kindred states are needed to clear up the author's position.

Especially suggestive, however, is the attempt to correlate certain grammatical categories with different kinds of adhesion. Obviously the grammatical category does not correspond to a certain kind of image (p. 65); it must then be sought in the kind of adhesion. The author's discussion here (p. 66) is rather summary, as he disposes of the four views on this subject in a few sentences. To be sure his own view should rest on his later arguments, but we feel that there need be no contradiction between the essence of his position and that of E. P. Morris. The universality of certain grammatical categories is, further, somewhat boldly taken for granted. *E.g.*, he says, "one finds nouns and verbs, with accidental differences, in languages of all kinds" (p. 66), and "there is agreement in the essence of their signification" (p. 67), however differently they are formed. How is one to know this before he knows what a noun or a verb is? As to the definition of grammatical categories: adhesion is to a *real* representation (or image) or to a *potential* one (p. 71); to a *relative* (consciously apperceived) or to an *absolute* (not so apperceived) representation. Now absolute adhesion defines the verb, relative the noun. Under nouns, real adhesion defines the substantive, potential the adjective (p. 74 ff.). The division is carried further; we have space only for this brief indication. We quote: "the difference which, little by little, has made itself felt between these adhesions, has been the cause of the categories differentiating themselves and subsisting" (p. 120). The proofs of the thesis are on the linguistic side elaborate and carefully divided; we are not qualified to judge of their merits, though they are, to the layman, persuasively ordered. On the psychological side, we feel that evidence is lacking. Suppose that adhesion be granted (itself no mean difficulty): do we feel in the alleged way about the parts of speech? Is our feeling of objectivity (cf. the definition given of adhesion) different toward *hope* as a verb from that we have toward *hope* as a noun? We believe, also, that the view that parts of speech have significance only in the *sentence* is not sufficiently considered.

Book III., 'Feeling and Appreciation,' is very suggestive, and we think fairly well demonstrated. Feeling is defined as 'the qualities,

the momentary experiences, of the self' (p. 123); appreciation is a transition between feeling and adhesion, or feeling + adhesion (p. 129). The term 'feeling' is used very loosely. It includes James' 'feelings of connection' as well as pleasure and pain. More psychology needed! Now 'feeling is a cause of language' (p. 127) and 'a living power in language' (p. 130)—witness the feeling-element in children's words. Feeling gives rise to many kinds of words: particles, adverbs, prepositions, conjunctions, interjections, and in general to all indeclinable words (p. 137). Of special interest to the psychology of thinking is the claim that the negative in language is not the logical negative, but expresses a feeling of resistance (pp. 198–208); hence, a double negative in language is not always equivalent to a positive (*e. g.*, *je n'ai rien*) but rather to a stronger negative (p. 199). We recall at present no logician who has made use of this fact, which seems to us amply proved. Appreciation accounts, among other things, for the category of gender.

Book IV., 'Will and Automatism,' leaves the discussion of single words, which the author regards as the primary units of language, and takes up the secondary units, *constructions*, as he calls them. There is, by the way, here some account of the will, and a definition of freedom which cannot but be regarded as dogmatic by the psychologist who knows the difficulty of the problem. But this does not affect his main thesis, which is, that *constructions*, in their involuntary growth, are governed by the four laws of automatism: ideo-motor action, inertia, rhythm and association. But what is a *construction*? One naturally expects it to mean a sentence. The sentence is, however, degraded to a *tertiary* unit. A little more psychology would have shown the author, we believe, that the sentence should be, instead of the tertiary, the primary unit of language. We had thought psychologists and linguists alike were practically agreed on this point (*pace* J. Ries, *Was ist Syntax*). Certainly the question is very inadequately discussed. But to return to the *construction*: it seems to mean a group of words which influence one another's meaning and external form directly (pp. 74, 357, 495). *E. g.*, *on the table, s'il vous plaît*, cases of indirect discourse, etc. The proof of his thesis is three-fold: in Phonetics, dynamic Semantics (how words change their meaning according to their context) and Word-order. This occupies the rest of the book, to p. 532.

Speaking roughly, the following seem to us the most striking points of the book: (1) The praiseworthy attempt to account for the deeper significance of language, its forms and growth, on psychologi-

cal ground. (2) The frequent lack of sufficient psychological evidence for his categories, *e. g.*, adhesion. (3) The synthetic character of the work, in attempting to combine historical, positivistic, and idealistic motives (p. 532). (4) The wide reading of the author: good bibliographies of even minute problems are frequent. (5) The mistake—at least from the psychological point of view—of beginning with single words rather than with the sentence. We do not believe the grammatical categories can be fully comprehended in this way.

The above account has of necessity omitted many significant features of the book. It is impossible to do justice to it in a short notice. No student of the psychology of thinking can afford to neglect it.

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### CHARACTER AND HANDWRITING.

*Les révélations de l'écriture d'après un contrôle scientifique.*

ALFRED BINET. Paris, Alcan, 1906. Pp. viii + 257.

Under the above title is reported a series of tests by the author designed to obtain answers under controlled conditions to the four following questions: Does handwriting reveal sex, age, degree of intelligence, character?

1. To answer the first question, one hundred and eighty envelopes, eighty-nine of which had been addressed by women and ninety-one by men, were submitted (*a*) to two professional graphologists, (*b*) to fifteen persons ignorant of the art, with instructions that they determine the sex of the writer of the superscription. The envelopes had, for the most part, passed through the mails, a fact which insured the naturalness of the writing; but all seals, headings, etc., had been removed from them. The inference of the sex of writer from the sex of the person addressed remained as a source of error.

Results showed that sex could be determined from handwriting with an accuracy above that of chance. The percentage of correct judgments varied from 63 to 78.8 per cent.; under favorable conditions it rose to 90 per cent. The professional graphologists made the best records. Three sorts of sex-suggestion were noted: writing which reveals to all observers the sex of the writer; writing the sex-revelation of which is ambiguous; writing that exhibits the signs of the opposite sex. In citing reasons for their judgments, the graphologists appealed (*a*) to the neatness, simplicity, firmness of the man's writing in contrast with the insignificance and incoherence of the woman's;

(b) to such graphic details as the superelevation of 'r' and 's' in the writing of women. The author leaves open the question whether the cause of this sex-difference be found in psycho-physiological or social conditions.

2. In the test on the revelation of age in handwriting, the envelopes used in the first test were submitted a second time. The calculation of the possible number of chance successes as well as the elimination of sources of error proved much more difficult in this than in the preceding test. The author concludes that handwriting does to a certain extent reveal age, since both expert and non-professional observers were able to give judgments superior to those of chance. As before, certain specimens gave unmistakable revelations of age; others, ambiguous indications; others, evidence of an age different from the real age.

3. In the third test, on the revelation of intelligence in handwriting, eight professionals as well as many ignorant of the art returned answers. There were numerous sources of error; uncertainty, for instance, as to the degree of intelligence of the writer. To avoid the effect of suggestion on the part of the experimenter the tests were carried on by mail. To overcome suggestions from letter-content, and at the same time accede to the graphologist's demand for a personal letter, the contents of letters used were mutilated by blotting out significant words. To eliminate the personal equation in estimation of intelligence there was utilized, on the one hand, the handwriting of men whose artistic and scientific achievements guaranteed their superior ability, of such men as Ribot, Marey, Sardou, Zola; and, on the other hand, the handwriting of adults of moderate fortune but slight achievement. Two collections of documents were submitted. The first included the writing of four inferior and thirty-three superior intelligences; the second consisted of specimens of the writing of four men of genius and twenty-five men of mediocre intelligence. Precautions were taken that no use should be made of judgments passed on handwriting that was recognized by the subject.

From the results of the test, Binet concludes that intelligence also is revealed in penmanship, although the extent of this revelation varies with the individual. The handwriting of certain geniuses bore for every observer unmistakable evidence of superiority; that of others was judged correctly in the majority of instances; certain documents offered great difficulties in the matter of interpretation. The graphic signs of intelligence, though granted an incontestable reality, are manifestly not always found in the handwriting of a man of great intelligence.

The author includes in his discussion analyses of the graphic signs of intelligence contributed by different graphologists. These analyses do not agree wholly; and the graphologists showed varying success in practice as well as disagreements in theory. Crépieux-Jamin, the most eminent of French graphologists, made first place in the tests, giving 91.6 per cent. of correct judgment in the intelligence tests when the documents were submitted in couples. When collections of documents were submitted his percentage of correct judgments fell to 87. Difficulty in estimating the value of graphology arises from noting the alternate successes and failures of graphologists, but Binet's figures show that there is more truth than error in their judgments. Their graphological portraits, however, are often extremely vague, although correct so far as they go.

The author urges the need of a more precise definition and interpretation of graphological signs. Vagueness results from the fact that the graphological reading is a matter, not of science, but of intuition. It is the *whole*, the relation of details, that is actually significant. The successes of non-experts bear witness not only to the truth contained in graphology but also to the intuitive nature of the interpretation, although on the whole non-professional readings were less accurate than the more reasoned ones of the experts.

4. The last problem concerned the revelation of character in writing. As personal judgments on character were recognized to be of limited value, use was made of documents written by great criminals and by men whose morality the author could guarantee. An attempt was made to choose the latter from the same social class as that from which the criminals came. As before the documents used were mutilated. The graphologists were unaware that the handwriting of criminals was being submitted and, in general, the methods employed involved only a gross differentiation of specimens on the basis of character of the writer. It was found difficult to estimate the results of the test. The author's general conclusion is that the errors in reading character from writing are much greater than those found in reading intelligence. The graphologists also exhibit in the latter test greater uncertainty.

In conclusion, the author states that his interest in the investigation centered in working out a method for dealing with such phenomena. These studies constitute but a fragment of a whole that should deal with all of the external signs of intelligence as manifested in physiognomy, form and lines of hand, intonation and timbre of voice, etc. Binet emphasizes the difficulty in working out a genuine

method of control, and closes with the declaration that, although there is something of truth in graphology, it is a science of the future.

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### FUNDAMENTAL PROBLEMS.

*Psychology: What is It about?* MARY WHITON CALKINS. Journal of Philosophy, Psychology and Scientific Methods, IV., No. 25; *Psychology as Science of Self*. The same, V., Nos. 1, 3, and 5.

The following is an epitome of these important articles :

"This brief series of papers is written in the firm belief that the study of psychology is made more difficult and that the advance of psychology is checked, first, through the common failure to recognize explicitly the real subject-matter of the science and, secondly, through the under estimate of adequate description in psychology. Both tendencies reveal themselves in what I take to be a mischievous disregard for consistent, though provisional, definition and for adequate classifications." The series is, accordingly, introduced by a defense of definition and classification as a basis for teaching psychology and as an aid to psychological investigation. Some definition and classification there must be, since the facts are too many for the span of attention to cover individually. Again, though definition and classification may be premature and too rigid or may be merely verbal, these dangers do not lessen the value or necessity of making the attempt. Thus the problem of the papers is 'to define the basal fact of psychology and to outline the essential divisions of psychology.'

#### *I. Psychology as a science of the idea : whose idea ?*

Of late years students of metaphysics have made various efforts 'to eject the term consciousness from our vocabulary,' but for the psychologist consciousness, as the opposite of the physical, must be accepted as a primary fact. "But even among psychologists who agree to define psychology as 'science of consciousness,' or 'science of mental life,' there is disagreement in regard to the further limitation of the conception." In fact there are three conceptions: (1) Psychology is the science of the mental state, or idea; (2) the science of the mental function; and (3) the science of the conscious self.

The last alone gives an adequate conception of the conscious life; and a critical examination of the two former conceptions will show that they implicitly imply this. Could, however, an explicit adoption of this view be had, it would clarify the treatment of psychology and

aid investigation. The first conception, the idea psychology, must raise the question 'whose idea?' and immediate experience replies, 'idea of a self, subject, mind, or ego.' Now "to refuse to deal with this self is indeed theoretically possible, but it is a needlessly abstract, an artificial, an incomplete procedure."

To the objection that this view is based solely upon the author's own self-observation, it is replied: "I must emphatically state that I have never found any upholder of idea psychology who does not unambiguously imply the consciousness of self as part of the experience described in terms of the idea." *E.g.*, Titchener defines 'mental process' in terms of self, and Münsterberg defines the psychical as 'that which may be experienced by one subject only.'

### *II. Psychology as science of mental functions: functions of what?*

The second conception, or "the theory of psychology as science of mental activities turns out to be a needlessly abstract, an arbitrarily inadequate view." "The conception of mental activity requires the conception of mental actor even more obviously than the full conception of the idea includes that of its possessor." Among functional psychologists there is a tacit acceptance of this conclusion. In fact at least two distinctly scientific conceptions of the 'mental function' are held by some of them: (1) The conception of the psychophysical organism; (2) a self related to a physical organism, yet not constituting with it a single reality.

These two theories of the self give us three distinguishable forms of self-psychology. (1) *The self a psychophysical organism.* There is the following objection to this view. In regarding mind and body as together making up a complex the psychologist compounds phenomena which are distinct, and he thus fails to account for the admitted distinction of the functions of the so-called psychophysical organism; for if it were justifiable to regard mind and body as compounded in such an organism, then its functions could never be either psychical or physiological but must always be psychophysical. Yet the existence of all three types is admitted. (2) *Self as mind-without-body, self unrelated to body.* This view is in no way held by the author. (3) *The self as distinct from body, but related to it.* "It has a body, but does not consist in body, is not made up of body and mind." Consequently self-psychology will study the bodily phenomena regularly accompanying the mental life, and their biological significance, and will investigate the physical facts antecedent to or accompanying certain facts of consciousness. But "what more precisely is the relation of the self to its body? that is, what reference

shall the psychologist make to physical phenomena?" In short, what constitutes an adequate description and explanation of conscious life? An examination of the attempts to explain this life by means of non-psychical principles leads to two conclusions. First, "it is evident that an ideally complete psychology must take account of those facts of physics, physiology and biology which border on the domain of psychology." Secondly, "on the other hand the physical, physiological and biological explanations of psychic phenomena are—many of them—insufficiently established and hypothetical in nature, and, secondly they afford an insufficient classification of psychic phenomena." Still "such explanations, however complete and well verified, can never exhaust the procedure of the psychologist. They are indeed subsidiary to his basal purpose, the description or portrayal of the psychic fact." "In other words, these non-psychological principles of explanation, useful as they are, are supplementary to the description of conscious experiences by psychological analysis."

### *III. The nature of the self.*

What are the positive characters of the self that do not belong to ideas or to function? (1) The self is in some degree permanent and persistent. "By persistence is not meant the ultimate self-identity but rather the kind of identity of which one is immediately conscious, notably in anticipating and in recognizing. (2) The self is inclusive, *i. e.*, is a complex of ideas, functions and experiences. (3) It is unique. This is experienced most clearly in our emotional and volitional consciousness. (4) Its relatedness. "Whether perceiving or thinking, feeling or willing, I am always conscious of something-other-than-myself to which I stand in some relation, receptive or assertive."

### *IV. The description of consciousness.*

In the concluding section the author indicates 'briefly how the doctrine of the self as basal fact of consciousness is essential to the description of our actual experience.' This description does not take the place of the structural analysis of consciousness into elements. On the contrary the latter must supplement the former and though essential does not supply a complete description of any conscious experience. "Our consciousness always includes in varying proportion and degree the awareness of the inclusiveness, the persistence, the uniqueness, and the relatedness of the self."

Here follows a tabular classification of psychical phenomena and their related non-psychical phenomena, followed in turn by a brief discussion of these different types of experience, especially of emotion, and giving certain amplifications and corrections of the author's earlier statements.

In conclusion answers are given to two fundamental objections to this theory of consciousness. First, how can a process-consciousness and an ego-consciousness be analyzed into the same elements without the reduction of the latter to the former? Second, granting the general correctness of this description of consciousness, is such a description not unnecessary? To the former the author replies: "If by conscious self (ego-consciousness) were meant a special kind of idea, this comment would obviously be correct. But by conscious self is meant the concrete reality of which the idea is a mere abstraction. It follows that all the positive content of the idea must be attributed to the self." Finally, description in terms of self-psychology is essential, for when it is omitted the description is inadequate. "The merely structural psychologist's treatment of emotion, thought, recognition, and the rest is indeed true so far as it goes, yet it goes but part way, toward portraying the tumultuous chaos of the conscious life. And psychology is both defective and artificial so long as it undertakes observation, experiment, and scientific description in disregard of the basal fact of the science."

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*The Stream of Consciousness.* E. B. McGILVARY. Jour. of Phil., Psych. and Sci. Methods, 1907, IV., 225-235.

*The Continuity of Consciousness.* W. T. BUSH. Jour. of Phil., Psych. and Sci. Methods, 1907, IV., 428-432.

In the first article James' doctrine of the 'numerous successive egos, no one conscious of itself but only of its glorious line of ancestors,' is examined and found to be inconsistent with the introspective evidence for the continuous stream of consciousness which James himself upholds. It is concluded that James "was after the 'transcendentalist' as well as after the facts, and in his endeavor to prove that introspection does not reveal an unalterable time-neutralizing ego, he went to the extreme of asserting the existence of little egos, constantly neutralized by time and transmuted each into its successor." The denial of a direct 'awareness of awareness' is thus a corollary of an erroneous proposition. Either the "thought knows itself unbroken, and in so knowing, knows itself; or it does not know itself, and, therefore, can not know itself unbroken." A continuous stream of thought demands an awareness of awareness. This, to be sure, is not generally attended to, for it 'never exists except in one indissoluble awareness of something else.' "We may not say that our awareness is an object of itself. . . . Consciousness is conscious of itself as consciousness; it is

conscious of its ‘object’ not as *consciencing*, if I may use this word, but as *conscienced*.” Neither may it be urged ‘that if there is an awareness of awareness, there must by the same token be an awareness of awareness of awareness, and so on *ad infinitum*,’ for ‘this way madness lies.’

In the second article the query is made as to what sort of continuity belongs to consciousness, a distinction being noted between that which *is* continuous empirically and that which *must be* continuous metaphysically. “If consciousness is . . . empirically continuous it must be either that all the objects which crop up in the course of experience are evidently cases of consciousness, or that they come to us having a gapless fringe or penumbra of consciousness, or that the continuity is maintained by means of a combination of objects characterized as consciousness and of consciousness-penumbra.” It is presumably the first alternative which is meant by the advocates of continuity. “But we can not continually ‘hold up’ life in the interest of philosophy, and the section of experience through which consciousness may, possibly, have been continuous, must be followed by sections full of practical interests and physical energy, in which consciousness very probably does not exist, consciousness, that is, as one type of ‘that’ along with other ‘thats,’ and therefore as something identifiable and distinguishable. Accordingly, if there is any truth in this way of describing the facts, consciousness is not empirically continuous, but occasional and intermittent.” Under which head, then, the empirical or the metaphysical, the *is* or the *must be*, does this continuity occur, and has the consciousness which is continuous ‘any subjective character’ or is it simply a “psychological word for ‘empirical situation’”? ”?

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*The Subconscious Factors of Mental Process Considered in Relation to Thought.* A. M. BODKIN. Mind, April, 1907; July, 1907.

Using feeling as an expression for emotional and sense experience the author asks the fundamental question: Is there a difference between sense and cognition — between feeling and knowing? There is a fundamental difference, though in our focal consciousness the two are always conjoined. Sense experience (feeling) must be conceived of as containing the material for the knowledge of relations.

The analysis of the concept of judgment brings out the author’s idea of the distinction between sensations and ideas. The predicates of our judgments constitute a world of ideas — a world of Platonic

ideas as conceived by Lotze. The bewildering content of sense experience is bound together by the efforts of the mind into unchangeable conceptions. These conceptions constitute an unfailing treasury for the predicates of our judgments. Judgment is the union of a perception with one of the ideals of the mind. It is a process of apperception in the Herbartian sense of the word. It seems to be the author's idea that the distinction between ideas and sensations is that between the above mentioned world of ideas and the impressions received from the objects presented to consciousness. In the process of perception there is no ideal element except in so far as the thing perceived is related to one of the unchanging conceptions in the world of ideas. There are sensations which are not related to any of the unchangeable concepts. They hover in the background of consciousness. When we discover what they are and can name them we relate them to some concept in the world of ideas.

The process of reasoning of necessity involves judgment. This, as we have seen, means a union of some perception with one of the concepts constituting the subject's world of ideas. But the judgment of inference is not merely grouped with other judgments. "It must be conceived as normally made for the sake of some further consequence — some value it will have in the guidance of actions — immediate or remote" (p. 366).

The foundation for our conclusion is not always explicitly known. Indeed men are often convinced as to some point and cannot clearly state why. The problem arises, whence comes this conviction — from unconscious cerebral conditions? Or does it arise from a mental content which affects the mind as a whole, but whose separate elements remain subconscious? The author maintains that the former alternative is insufficient to account for the facts. In developing the latter he shows how subconscious and implicit factors of our thought become fully conscious and explicit.

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#### PERCEPTION AND REALITY.

*In What Sense Two Persons Perceive the Same Thing.* G. S. FULLERTON. Phil. Rev., 1907, XVI., 506-518.

Before taking up the specific problem indicated by the title, the author first considers in what sense a person may be said to perceive twice the same thing. The conclusion is that we do not mean that we have the same experience again, for we can never have the same

percept twice. The meaning, then, can only rest on the identity of the object. Proceeding now to the problem of two persons perceiving the same thing, we are obliged to distinguish not merely one subjective and one objective order, but more than one subjective order each related to an objective order. If the objective order is discarded and the idealistic position accepted, how can we explain the *togetherness* of the subjects, the *sameness* of their experience? In what are they together, and in what sense is their experience the same?

This suggests another question for realism to deal with. If there are many minds, may there not be as many objective orders? If so, it is evident there can be no real togetherness or sameness of experience. But how do we get to these many minds save by crossing from one to the other on the bridge of the objective order? It is true that we deal only with experience, and no two experiences can be identical, "if they were we could not call them two." Yet these experiences form a system, and we may pass from one part of the system to another. "The bridge that helps us over may take on one aspect or another. In so far as it performs the same function, it is the same bridge. Both in common thought and in science it is recognized as the same." The unity and system of our experience, then, demands one objective order; otherwise there is no meaning to experiencing one thing twice, nor any meaning to a multiplication of subjective orders interrelated in a system of experience.

*The Control of Ideas by Facts.* JOHN DEWEY. Journ. of Phil., Psych. and Sci. Methods, 1907, IV., 197-203, 253-259, 309-319.

After noting the many misapprehensions raised with regard to functional logic, and its method of attacking the problem indicated in the title,—which 'remains the central question of any theory of thinking and its relation of facts to truth'—the author proceeds to a restatement of the problem and a defense of the functionalist's position as providing the only satisfactory method of solution.

It is first pointed out that "every situation of reflective knowledge involves a discrimination and a reference of existence and meaning, of datum and ideatum." As for the 'facts' in the situation, they refer not merely to the present environment, but also to something absent. "Now this absent, which is intended by the presented or factual, is asserted to be just as real as the presented itself." Indeed, the presented facts are '*not* the whole and genuine reality,' but are rather to be considered 'as a distorted and perverse portion of it, requiring absent portions in order to be made sound and whole.'

"The relationship of given fact and idea stands then as follows: Neither is real in the sense that it can be cut off from the other and *then* taken to be the total reality. . . . Both are real in the sense that they present that reality as a condition of disturbed . . . values. *Both present one and the same reality: but, as distinguished from one another, present it from different standpoints, or in different functions.* The 'given' facts are the reality in its *existent* disorganized state of value. The 'idea' or intended is this same reality in its *projected rectification.*" It is thus easily seen that 'fact' and 'idea' 'have a certain agreement or correspondence with one another from the start.'

As to the control of ideas by facts, there are two aspects: (1) The total situation which we have 'postulated as fundamentally real in form,' but which is only 'intended or suggested' in that which is present, controls by this intention the determination of the 'given.'

(2) The given facts exercise a control 'over the formation of the content of the end, purpose or intent,' that is, the disturbed values which immediately confront one are 'coercive as regards the idea, and control its formation as to specific content.'

These conclusions justify the functionalist's position: "Reality in its characterization as fact, in the logical force which it has, . . . is not . . . something outside of or given to the reflective situation, but is given or determined *in* it. . . . If the reflective situation were purely intellectualistic, then the objective idealist would have logic on his side; but since it is a focusing of a disturbed system of activities and divided values, we have a dynamic realism. Similarly the idea is not a fixed thing, an entity, existing in some ontological psychical region, and then happening to get caught in a reflective situation. If it were, either the subjective idealist would be right, or else the determination of truth would by its nature be impossible. But idea is a logical determination, ultimately practical in origin and function. What on one side is a name for operative realism, names on the other an experimental idealism."

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### ASSOCIATION.

*Studien über die experimentelle Beeinflussung des Vorstellungsvorlaufes.* II. MAX LEVY. Zeitschr. für Psychologie, XLV., 321-340.

This article is a continuation of the clinical study reviewed in the 1907 volume of this journal. The author first refers back to his criticism of the usual method employed in experimental investigations of

the problem of association. He then recalls his own method, which consists in interrupting a stream of ideas in the patient by a word which is spoken by the experimenter. Then follows a classification and discussion of the reactive attitudes of the reagents and of the forms of associative connection.

Since the manner of reaction (*Reaktionsweisen*) depends upon many factors in addition to the stimulating word, only the most general divisions can be made.

1. "The physiological (normal) manner of reaction, that which can be called normal without any qualification."

2. A group of associations which of themselves might be either normal or abnormal and can only be classified by reference to accompanying circumstances.

3. Those which unquestionably show an abnormal attitude.

The attitude in the first group depends primarily upon (1) the formal annoyance which one experiences at the instance of an unmotived interruption, (2) the mystifying effect produced by hearing a single word without any connection and the usual reference of the act to a disordered mind. The second group depends upon the amplifying activity of the individual and that again upon his previous experience and present condition. This amplifying may appear normal or abnormal according to what the operator had in mind or what the patient was thinking of. And its class can only be determined by recourse to further reactions which may indicate an origin in either a diseased or a normal mind. The third group takes no attitude from the interruption, neither does it depend upon the amplifying of the stimulating impression; it simply shows associations added after the manner of the flux of ideas in the maniac.

After considering the manner of reaction as either normal or abnormal he makes a classification of the forms of association. The principles of division which refer primarily to the objective relation of association to stimulus are rejected as of no value for clinical purposes where one is seeking symptoms of pathological states; for this purpose the significant factor is not the formal nature of the act but the motive which actuated it. To this end associations are classified under two general heads.

1. Those in which the reagent relates the stimulus word to his own special personal interests or general condition.

2. Those in which personal factors remain wholly out of consideration.

The former may have reference merely to a particular personal

experience, *e.g.*, to the word 'key' the reagent replies: I have in my room, etc. Or it may refer to a special or chronic mental state of the individual, *e.g.*, to the same word another reagent replies: Yes! the key of heaven. My God, close not the gates of heaven, etc. The second class is subdivided, after Ziehen, according as the stimulus word is apprehended with any meaning or merely as an auditory or written word symbol, into (1) object-associations, (2) verbal associations, and a third subdivision is added, viz., dissociative associations. Group (1) may be illustrated by: stimulus word 'cat,' association 'is a predatory animal.' Group (2) is less definitely limited but may be illustrated by: stimulus word 'Schlange,' association 'Klange.' In the last subdivision all those associations are grouped in which no relation between the stimulus word and the association could be discovered. The author remarks in closing that it is impossible to classify under these heads simply from the objective point of view, since without other consideration some cases of mere verbal association could not be distinguished from object-associations.

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*Ueber den Einfluss der Geschwindigkeit der Aufeinanderfolge von Reizen auf Wortreaktionen.* HENRY J. WATT. Archiv für die Gesamte Psychol., 1907, IX., 151-179.

Words — nouns — in series of 21 or 13 were pasted on a drum which was revolved at different rates before a slit in a shield. Reagents viewed the words as they passed the opening and reacted to them by pronouncing such words as they thought of. Twenty reagents acted for three series of experiments. Great individual differences in power to react with associations were shown. Some found rates agreeable that others could react to only by leaving out reactions at more or less regular intervals. The best rate for reaction for most reagents was near one word per second. Some reagents reacted more often with nouns and others more often with adjectives. While some made use of verbs about one third of their time, none used them a majority of the time and some did not use them at all. The repetition of reaction words was studied. This showed that words were more likely to be repeated in the second series after the series in which they were first used than at any other time. The most frequent repetitions therefore came within six minutes after the word was first used. Repetitions ceased after thirty minutes. The results here seem to show that Fuhrmann's feeble-minded patients did not fall below some normal subjects in their tendency to repetition. The reader cannot help

but be impressed with the disparity between the meager results and the great amount of careful and painstaking work that has been done.

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### MENTAL HYGIENE.

*Technischer Fortschritt und seelische Gesundheit. Mit einem Geleitwort: vom Bildungswert der Psychologie.* WILLY HELLPACH. Halle, Marhold, 1907.

An introductory lecture on psychology at the Technische Hochschule, Karlsruhe, with emphasis on the rôle of psychopathology, on the relation of excessive facilitation of human intercourse to the 'nervousness' of the bourgeoisie through chronic over-excitation, and on the frequency of accident-neuroses in the working classes fostered less by the insurance laws than by the cutting off of the worker from the real purpose of the work and his subjection to a simple grind. Hence the importance of the study of the relation of satisfaction of the work to the effect of wear and tear. He further discusses the risks—and actual deficits—of the inventors and of the captains of industry. He points to Borkmann as a classical picture. An adjustment of these new developments cannot be reactionary. It goes towards possibilities of separation of home and working-place and facilitation and differentiation of the means of traffic and intercourse. The lecture is an interesting sketch which cannot fail to rouse a practical interest in problems of mental hygiene on the part of those apparently most distant from psychological interests, the practical technician.

A. M.

### DISCUSSION.

#### THE RELATION OF FEELING (AFFECTION) TO EMOTION.

The term 'feeling' has been used in recent discussion to cover the consciousness of pleasantness and unpleasantness and any strictly co-ordinate elemental experiences.<sup>1</sup> Accepting, for the present, this use of the term — though I see objections to it<sup>2</sup> — I wish here to call at-

<sup>1</sup> One need not subscribe to the Wundtian list of 'feelings' to hold that there are feelings other than those of pleasantness and unpleasantness. But the problem of the number of the feelings is not here under discussion.

<sup>2</sup> My own preference (which, however, seems to find little favor) is to use the term feeling of 'any conscious experience whether elemental or complex.' (Cf. my *An Introduction to Psychology*, p. 150<sup>3</sup>.) This usage, proposed by James (*Principles of Psychology*, I., pp. 185-186), seems to me in the highest degree convenient, for we have no other single word which can well be put to

tention to the frequent confusion of feeling, thus defined, with emotion. Such a confusion ignores the following important distinctions:

The affections, or feelings of pleasantness and unpleasantness (and the like), are results of a structural analysis of consciousness—that is, of an analysis of consciousness conceived in artificial abstraction from the related conscious self.<sup>1</sup> Emotion, on the other hand, may be conceived either from an exclusively structural or from a more than structural point of view. Titchener's conception of emotion as 'a strong affection,' 'enriched by organic sensations' and by associated images<sup>2</sup> is a purely structural theory of emotion; Lipps, who treats emotion as 'relation of the personality, the psychic individual' to its experience, defines emotion without recourse to structural analysis.

The confusion of feeling (or affection) with emotion overlooks, in the second place, the simplicity of feeling and the complexity of emotion. From this last-named tendency to ignore the complexity of emotion has followed a curious, though an explicable misconception of the James-Lange theory. Critics persist in treating it as if it were a theory of feeling, and then they conclude from its emphasis on organic sensations that it conceives of pleasantness and unpleasantness, after Stumpf's fashion, as sensational.<sup>3</sup> But the James-Lange theory is essentially a doctrine of the complex emotion, not of the elemental feeling; and though James emphasizes the organic sensations as significant constituents of emotion, he never denies and once, at least, asserts the occurrence in emotion of the elemental consciousness of pleasantness and of unpleasantness.<sup>4</sup> It is doubtless true, as Professor Johnston shows in the paper just cited, that the James-Lange theory has, as a matter of fact, been conceived (especially by continental writers who start from the standpoint of physiology) as 'a peripheral such a use, whereas 'feelings' of pleasantness and unpleasantness may be termed 'affections' and grouped with any coördinate experiences under the term 'attributive elements.' Since, however, we have no verb corresponding directly either with 'affection' or with 'emotion,' psychologists will probably go on using the expressions 'feeling' and 'to feel' to cover both affective and emotional consciousness. This third use of the word 'feeling' is doubtless in part responsible for the confusion which this paper discusses.

<sup>1</sup> Cf. the passages cited in the first note on p. 343.

<sup>2</sup> Cf. *An Outline of Psychology*, § 57 (in edition of 1896).

<sup>3</sup> Cf. C. H. Johnston, PSYCH. BULL., V., pp. 65 ff., 1908.

<sup>4</sup> Cf. PSYCHOLOGICAL REVIEW, I., pp. 516 ff., 1894. Professor C. H. Johnston can hardly have had this paper in mind when he says (*op. cit.*, p. 72) "James nowhere in his psychology, so far as I can find, recognizes that there are two elemental constituents of the mental life." (How, by the way, does he interpret James's distinction, *Psychology*, I., pp. 244 ff., between 'substantive' and 'transitive' states of 'consciousness'? )

theory of feeling'—in other words, as a virtual reduction of affection to sensation, and it is certain also that James lays himself open to this misconstruction by his great interest in the organic sensations and by his superb indifference to pleasantness and unpleasantness. None the less, the conception of the James-Lange theory as purely sensationalistic, is a misconception of a theory which really concerns itself not at all, in one way or another, for the affective elements—the 'feelings.'

The other form of the confusion between feeling and emotion is, I think, more important and is certainly wider spread. The character of subjectivity is incorrectly attributed to pleasantness, unpleasantness, and to any other 'feeling.' But subjectivity—though (as I hold) a distinctly psychological category—is a category of emotion, not of elemental feeling. The structural analysis which results in the discovery of elements of consciousness implicitly or explicitly disclaims all reference to the conscious self. Accordingly, Wundt, Alechsieff and others wrongly distinguish the affective element from the sensational element<sup>1</sup> on the ground of its 'subjectivity'; though this subjectivity (better the explicit consciousness of self) may indeed distinguish emotion.<sup>2</sup>

To this failure to apprehend the distinction between (1) the structural analysis of consciousness and (2) the explicit recognition of the relations of the conscious self, I attribute Professor Jonnston's misconception of my own theory of emotion. Mr. Johnston credits me<sup>3</sup> with the view that "psychologists should proceed," in the analysis of emotion, "equipped with these three fundamental, disparate elements, sensational, affective, and self factors." On the contrary, I everywhere insist that the conscious self is in no way coördinate with sensational and affective elements;<sup>4</sup> that it is rather the basal fact of psychology, and that the sensations and affections are results of the

<sup>1</sup> Cf. N. Alechsieff, 'Die Grundformen der Gefühle,' *Psychologische Studien*, III., pp. 159 seq.

<sup>2</sup> Cf. Titchener, *The Psychology of Feeling and Attention*, p. 40: "The single elements carry no such distinction upon them." (This is an advance upon Titchener's earlier treatment of affections as subjective. Cf. *An Outline of Psychology*, p. 96, 1896.) It has already been observed that Titchener does not characterize even emotion as 'subjective.'

<sup>3</sup> *Op. cit.*, p. 75, note.

<sup>4</sup> If one were giving a complete list of structural elements—rather than a list of the elements prominent in emotion—one would, according to my belief, include also 'relational elements'—not to name attributive elements coördinate with the affections. Cf. *An Introduction to Psychology*, Chapters IX. (in the second edition) and X., and corresponding passages in other expositions of my teaching.

merely structural analysis (one of several essential analyses) of this conscious self.<sup>1</sup> Accordingly, I describe emotion both as complex of structural elements and as an experienced passive relation of a self to its object—an experience in which both self and object are individualized.<sup>2</sup>

So far, now, as I can see Mr. Johnston's only argument in opposition to this conception of emotion consists in his criticism (p. 75) of my assertion that emotion is insufficiently described by a reference to accompanying bodily attitudes and to constituent organic sensations. "Our almost total ignorance of organic sensations . . .," Mr. Johnston says, "might tend to show such a claim untenable. The other statement . . . that the number of possible attitudes is insufficient to square with the number of possible emotions is, I think, adequately met by Münsterberg." Mr. Johnston may be justified in both criticisms, but both of them affect an incidental argument only and not any essential feature of my doctrine. The conception of psychology as science of the conscious self is based on the argument (which I must not here take time to restate) that other conceptions of psychology presuppose this one, and on the appeal to every man's introspection to show him that by 'perception,' 'thinking' or 'feeling,' one always means a self perceiving, thinking, or feeling.<sup>3</sup> One might, therefore, find for every emotion a characteristic organic sensation and a distinctive bodily attitude, yet the emotion would not be adequately described until one classified it also as experienced relation of self to environment.

While I am about the ungracious business of deprecating what appear to me as unintended misstatements of my teaching, I may add a word concerning two others, though they fall outside the exact subject of this brief paper. Professor Johnston attributes to me<sup>4</sup> the conception of 'idea' as 'sensation and image complex' (and by inadvertence these words are included in a sentence apparently quoted from me). On the contrary, I expressly disclaim—perhaps unwisely but at least unambiguously—this very common use of the term

<sup>1</sup>Cf. *An Introduction to Psychology*, pp. 151, 155; *Der doppelte Standpunkt in der Psychologie*, pp. 34-35; 'A Reconciliation between Structural and Functional Psychology,' *PSYCHOLOGICAL REVIEW*, XIII., pp. 63 ff., 69, 1906; 'Psychology, what is it about,' *Journal of Philosophy*, V., p. 113.

<sup>2</sup>*An Introduction to Psychology*, second edition, 1905, pp. 263-265 ff.; *Journal of Philosophy*, V., 1908, pp. 119-122.

<sup>3</sup>Cf. *Journal of Philosophy*, Vol. IV., pp. 676-683; *An Introduction to Psychology*, pp. 150 seq.; 'A Reconciliation between Structural and Functional Psychology,' *PSYCHOLOGICAL REVIEW*, XIII., pp. 63-68.

<sup>4</sup>*Op. cit.*, p. 75, note.

'idea.' I have always employed the word in the wide sense which Locke gave to it, to mean any complex fact of consciousness (affective and volitional as well as sensational) when 'regarded in abstraction from any self . . . and viewed as temporal.'<sup>1</sup> A curious result of this misunderstanding is that Mr. Johnston fails, apparently, to realize my entire agreement with him, in the main contention—or one of the main contentions—of his paper, that the affective consciousness cannot be reduced to sensational factors.

The last of the misconceptions to which I have ventured to refer is contained in one sentence of Professor Max Meyer's paper on 'The Nervous Correlate of Pleasantness and Unpleasantness,' published in the July number of the PSYCHOLOGICAL REVIEW. I have no intention of defending, in detail, my avowedly hypothetical account, drawn from many sources, of the nervous correlate of affection and emotion. I still think that the theory has some plausibility and that it fairly well explains the observed phenomena; but I see advantages also (along with certain disadvantages) in Meyer's equally hypothetical theory.<sup>2</sup> I also admit the justice of his objection<sup>3</sup> to my too unqualified statement of "the fact that pleasantness is accompanied by 'more vigorous movements,'" as support of my theory. The relations between feelings of pleasantness and unpleasantness and bodily movements are, as Meyer points out, more complicated than my text indicates.

I protest, however, against the psychology and the logic of the following paragraph: "As one of the supports of this theory," Mr. Meyer says, "is mentioned the probable fact that injury to the frontal lobes is accompanied by derangements of the emotional life. This argument, of course, can appeal only to those who regard 'pleasantness and unpleasantness' and the 'emotional life' as synonymous terms. . . ." In opposition to Mr. Meyer, I must insist that the argument appeals as well to those who hold as I do, with most psychologists, that 'pleasantness' and 'unpleasantness' are *constituents*, or elements, of the 'emotional life' as to those (if there are any such) who believe, what I expressly deny, that the emotional life is *identical with* pleasantness and unpleasantness. Certainly the frontal lobe consideration is no conclusive argument, but it is, I think, a 'support' to a cerebral theory of the physiological condition of the affections.

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<sup>1</sup> *Journal of Philosophy*, IV., p. 678. Cf. *An Introduction to Psychology*, p. 150<sup>3</sup>.

<sup>2</sup> PSYCHOLOGICAL REVIEW, XV., 5, p. 307.

<sup>3</sup> *Ibid.*, XV., 4, p. 213.

## 'THE ANIMAL MIND.'

One or two points raised in Dr. Waugh's review, appearing in the issue of this journal for June 15, of my book, *The Animal Mind*, seem to me to call for a word of further discussion.

Dr. Waugh says: "The author is inclined to doubt the importance attached by some experimenters to the rôle of kinæsthetic sensations in the learning of animals. Watson concludes from experiments on the rat in the Hampton Court maze that the guiding factor is kinæsthetic, on the ground that rats, after being deprived of all the special peripheral sense organs, could run the maze successfully. Miss Washburn criticizes this conclusion—suggesting that 'a habit may be quite independent of the stimuli that served to form it, as the pianist becomes independent of the notes in playing a familiar piece'; that is to say, the guidance is *turned over* to the kinæsthetic sense." I did not mean that the formation of a habit involves the turning over of its guidance to the kinæsthetic sense, nor do any of my statements imply such a belief. My criticisms of the conclusions of Professor Watson in this matter were two. In the first place, I think that a perfectly formed habit such as that of running a maze is not guided by kinæsthetic sensations, any more than by visual sensations; that it has no conscious guidance at all, but has become automatic. My difficulty in making myself clear to Dr. Waugh on this point seems to be connected with the fact that he understands by 'kinæsthetic sensation' an unconscious process, while I mean by it a conscious process. For instance, he says in the same review, "In man, after the control is taken over by the kinæsthetic sensations, consciousness is free to be applied to other things." Kinæsthetic sensations, in my terminology, demand consciousness, and I should use the term 'kinæsthetic sensory impulses' instead of 'sensations' here. My second criticism was that even though an animal could learn a series of movements as quickly when deprived of a sense as when possessing it, we could not be sure that it would not have used the lost sense if it had had it. This point is brought up in my later review of Watson's work.

Again, in discussing my theory of the significance for the origin of the memory idea, of reaction to stimuli from a distance, Dr. Waugh says, "We must take exception to the statement that the distance receptors do not bring about immediate reactions. Sounds are noticeable for the immediacy with which they occasion motion." My contention was not that a distance receptor could not bring about an immediate reaction, but that it need not, for the safety of the

organism, do so; that reaction to it might without danger be suspended more frequently than would be the case with a contact stimulus. The problem as to what bearing upon this theory the comparative lengths of reaction times to different classes of stimuli may have is a difficult one; evidently the conditions of a reaction experiment, where the human observer is required to respond as quickly as possible, are quite unlike those of ordinary life.

MARGARET FLOY WASHBURN.

VASSAR COLLEGE.

### BOOKS RECEIVED FROM SEPTEMBER 5 TO OCTOBER 5.

*Lectures on the Elementary Psychology of Feeling and Attention.*  
E. B. TITCHENER. New York, Macmillan, 1908. Pp. ix + 404.  
\$1.40 net.

*Neurological and Mental Diagnosis. A Manual of Methods.* L. PIERCE CLARK, M.D., and A. ROSS DIEFENDERFER, M.D. New York, Macmillan, 1908. Pp. x + 188. \$1.25 net.

*The Problem of Age, Growth and Death. A Study of Cytomorphosis based on Lectures at the Lowell Institute, March, 1907.* CHARLES S. MINOT. New York, Putnam, 1908. Pp. xxii + 280.

*Biennial Report of the Board of Health of the City of New Orleans, 1906-1907.* New Orleans, Brandao Printing Co., 1908. Pp. 126.

*Elementargedetze der bildenden Kunst. Grundlagen einer praktischen Aesthetik.* HANS CORNELIUS. Leipzig, Teubner, 1908. Pp. viii + 197. Mk. 7.

*Les hallucinations télépathiques.* N. VASCHIDE. 2<sup>e</sup> éd. Bibl. de psychol. exp. et de métaph. Paris, Bloud & Cie., 1908. Pp. x + 97. Fr. 1.50.

*Le spiritisme dans ses rapports avec la folie.* MARCEL VIOLET. 2<sup>e</sup> éd. The same. Pp. 120. Fr. 1.50.

*L'audition morbide.* A. MARIE. The same. Pp. 146. Fr. 1.50.

*Les préjugés sur la folie.* PRINCESSE LUBOMIRSKA. (Pref. by J. VOISIN.) The same. Pp. xv + 87. Fr. 1.50.

*La pathologie de l'attention.* N. VASCHIDE and R. MEUNIER. The same. Pp. 115. Fr. 1.50.

*Les synesthésies.* HENRY LAURES. The same. Pp. 98. Fr. 1.50.

- Wholesale Prices. Industrial Hygiene.* Bull. Bureau of Labor. Washington, Gov. Print. Office, March, 1908. Pp. 283-663.
- Evolution of the Human Soul and the Future Life Scientifically Demonstrated.* N. C. ANDERSON. St. Paul, Anderson Publ. Co. (No date.) Pp. 202.
- Bulletin of the University of Wisconsin.* No. 182. *The Labor Contract from Individual to Collective Bargaining.* M. A. SCHAFFNER. 1907. Pp. 182.—No. 198. *The Labor History of the Cripple Creek District.* 1908. Pp. 166.—No. 193. *The Financial History of Wisconsin.* R. V. PHELAN. 1908. Pp. 187-275.
- Proceedings of the American Association for the Advancement of Science (Ithaca, 1906, and New York, 1906-7).* The Secretary, 1907. Pp. 677.
- I presupposti filosofici della nozione del Diritto.* G. DEL VECCHIO. Bologna, Zanichelli, 1905. Pp. 192.
- Das Denken und die Dinge oder Genetische Logik.* Bd. I. *Funktionelle Logik.* J. MARK BALDWIN. Deutsch von W. F. G. GEISSE. Leipzig, Barth, 1908. Pp. xvi + 334.
- Untersuchungen zur Grundlegung der allgemeinen Grammatik und Sprachphilosophie.* Bd. I. A. MARTY. Halle, Niemeyer, 1908. Pp. xxx + 764.
- The New Schaff-Herzog Encyclopedia of Religious Knowledge.* Vol. I. *A to Basilians.* New York, Funk & Wagnalls Co., 1908. Pp. xxx + 500.
- The Problem of Form in Painting and Sculpture.* A. HILDEBRAND. Trans. by MAX MEYER and R. M. OGDEN. New York, Stechert, 1907. Pp. 140.
- Das Seelenleben des Kindes.* K. GROOS. 2. Aufl. Berlin, Reuther & Reichardt, 1908. Pp. 260.
- The Psychology of Advertising.* W. D. SCOTT. Boston, Small, Maynard & Co., 1908. Pp. 269.

## NOTES AND NEWS.

PROFESSOR C. H. JUDD has resigned from the professorship in psychology and the directorship of the psychological laboratory at Yale University to accept the position of dean of the School of Education and head professor of education at the University of Chicago. Professor Judd will continue his work at New Haven until June, 1909.

AT Vassar College Dr. Margaret Floy Washburn has been advanced from associate professor of philosophy to professor of psychology.

DR. FLETCHER BASCOM DRESSLAR, associate professor of education at the University of Chicago, has been appointed to the chair of philosophy and education at the University of Alabama, to succeed Professor E. F. Buchner.

THE following are taken from the press:

DR. GUY A. TAWNEY, of the University of Illinois, has been elected professor of philosophy in the University of Cincinnati, to succeed Professor H. Heath Bawden.

JAY WILLIAM HUDSON, Ph.D. (Harvard), has been appointed assistant professor of philosophy in the University of Missouri.

DR. FRIEDRICH PAULSEN, professor of philosophy and pedagogy at the University of Berlin, died on August 15. Dr. Otto Pfleiderer, professor of systematic theology at the same University, died on July 20.

AT Stanford University Henry Waldgrave Stuart has been promoted to associate professor and George Holland Sabine to assistant professor of philosophy.

DR. WALLACE CRAIG, of the University of Chicago, has been appointed to the chair of philosophy and psychology in the University of Maine.

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THE

# PSYCHOLOGICAL BULLETIN

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## THE EVOLUTION OF THE SENSES.

BY DR. OSKAR NAGEL,

*New York City.*

In a previous article<sup>1</sup> I have made a few remarks on the development of the color sense, which was gradually formed from the ability of distinguishing light and dark, just as the latter was developed from a most primitive sense for temperature and radiant energy. The field of reaction of the eye upon radiant energy was and is continuously increasing, and the exactness of this sense is constantly improved. Our citrafunctions were ultrafunctions for our ancestors, and our ultrafunctions will be citrafunctions for future generations. The thresholds of sensibility are constantly being decreased, the thresholds of differences lowered. Our adaptation to the outside energies acting upon us is somewhat like a reaction going on towards an equilibrium, without ever reaching the latter. The ability of evolution of the protoplasm results in evolution only by reason of the outside energies. If we would be perfectly adapted to these energies, if the reaction between the latter and our organism would be completed, our evolution would stop, notwithstanding the tendency of evolution in the organism. Our individuality would cease, we would be all alike, we would act alike and think alike. We would be so accustomed to our surroundings, that the accumulation of new experiences would stop, and our mental life would be reduced to instincts and reflex movements. By reason of the insensitiveness towards irritations, organic life would cease. Life is only possible by the presence of adaptability and the simultaneous action of uncompensated outside energies.

From this point of view the necessity of evolution can be concluded from Carnot's principle: in the presence of differences of in-

<sup>1</sup> PSYCHOL. REVIEW, July, 1908.

tensities (of energies), something will happen. As long as light is radiated by the sun, preventing a state of equilibrium, the motion, in the widest sense of the word, will not stop. Carnot is the founder of the exact theory of evolution.

A similar evolution as has been shown with the optic sense, can be observed with the auditory sense. In low animals the auditory organ is but a little bladder filled with otoliths, which serves only as a sense for progressive motion and not for hearing.<sup>1</sup> In the course of evolution 1, 2, 3 canales circulares are developed, while the otolithic organ is getting more and more complicated. The investigations of Mach, Breuer and other scientists make it very probable that the canales circulares are the sensitive organs for the sensation of angular acceleration. Finally from one part of the otolithic organ (*lagena*), the cochlea is developed, especially in the higher vertebræ, as organ for the sensation of noise and then of sound. We see that the functions of the organs are undergoing quite a change during the evolution. From a sense for temperature there is developed a sense for color, from a sense for motion a sense for sound. And as the eye gets adapted to a wider and wider field of colors, so the ear to a wider field of sounds.

The gradual increase of the capacity of the central sense, the brain, is easily observed.<sup>2</sup> The lower animals are restricted to reflex actions, they are nearly entirely unable to accumulate individual experiences, as experiments with snails, spiders and moths have shown. Some fishes show a much higher intelligence, while the birds have already a comparatively considerable memory. The higher mammalia have a good mechanical memory and can undoubtedly distinguish between identical and different phenomena. But only man acquires the faculty of forming and connecting long series of ideas.

The evolution of the senses is the basis of human history. The development of the fine arts depends mainly and hence keeps pace with the evolution of our optic sense, our perspective- and color-faculty. The development of music is a consequence of the evolution of the auditory sense. The evolution of the faculty of forming longer and longer series of ideas is described in the history of the sciences. The development of the senses shapes the arts, the sciences, the technical progress and the social conditions.

<sup>1</sup> Mach, *Pop.-wiss. Vorl.*, 3. Aufl., p. 400.

<sup>2</sup> Mach, *Pop.-wiss. Vorl.*, 'Zufällige Umstände bei Erfindungen.'

# GENETIC LOGIC AND THEORY OF REALITY ('REAL LOGIC').<sup>1</sup>

BY J. MARK BALDWIN,

*Professor in the Johns Hopkins University.*

The paper of which this is an abstract, after stating the problem and method of Genetic Logic—as developed in the writer's work of that title cited below<sup>2</sup>—shows:

1. That Genetic Logic *lays the basis for Epistemology* (the theory of the objective reference of knowledge), and—
2. That such an Epistemology, in turn, is the foundation of a *positive doctrine of the meaning of Reality*. This latter problem—that of the meaning of Reality, as indicated by Genetic Logic—I call *Real Logic*.

These two positions are taken up in turn and the following conclusions reached:

## I. *Genetic Logic and Epistemology.*

1. Genetic considerations—as worked out in the writer's *Thought and Things or Genetic Logic*,<sup>3</sup> especially Vol. ii., Part iv.—establish certain 'dualisms and limitations of thought.' Thought is found to be a function of dualism in the sense that it *mediates facts or truths through ideas*. By this mediation ideas or representations of all kinds are redistributed to the spheres in which their direct experience occurred. They are thus placed under either an external or an internal *control*, under which they are found to be 'true.' In this respect, then, thought is 'mediate': it mediates a more direct experience and refers to a dual control which is in this sense 'remote.' This

<sup>1</sup> Abstract of paper prepared for the Inter. Congress of Philosophy, Heidelberg, September, 1908.

<sup>2</sup> Genetic Logic applies to knowledge the method of genetic or developmental science which treats development as a progression through *essentially new stages or modes* (cf. the writer's work, *Development and Evolution*, 1902, Chap. XIX.; also M. Bergson's treatment in the same sense in his important work, *Évolution créatrice*, 1907).

<sup>3</sup> London, Sonnenschein; New York, Macmillans, i., 1906, ii., 1908; German trans. issued by Barth, Leipzig, vol. i., 1908, vol. ii. in preparation; French trans., Paris, Doin, vol. i., 1908, vol. ii. in preparation.

This paper presents some of the conclusions of vol. iii., not yet published.

dualism thought as such *cannot escape nor overcome*. *Thought issues in an epistemological dualism.*

2. Thought has limitations in respect to its scope. There are certain experiences whose essential meaning for consciousness cannot be rendered through the mediation which is characteristic of thought, since they escape the grasp of generalization and judgment by which thought proceeds. Such experiences are: the 'singular' in certain of its forms (*e. g.*, that which is made singular by the operation of a private and exclusive interest); the 'subject-self' presupposed in all acts of thought; and the assumptive or imaginative suggestion (or 'schema') when it is still personal to the individual's psychic life. Immediate *worth* experiences, also, lose their directness and full meaning when rendered descriptively in judgment. We conclude, therefore, that thought is limited in its rendering of experience, and that there must be a resort to some other function if the types of meaning mentioned above are to be given epistemological value. Or more positively — the meaning of whatever there is beyond the psychic life itself, is not exhausted by thought; the *alogical* meanings must also have their place in the theory of what is real.<sup>1</sup>

3. In general, then, we may say that thought and practice are only modes in which the 'real' is relatively apprehended. Besides these two, there are other modes of 'realizing' which have their own claim to recognition in the epistemological interpretation of experience as a whole. The further problem, therefore, that of *Real Logic*, is the problem of finding that experience in which the several modes of 'finding-real' are all included and intrinsically satisfied.

## II. *Real Logic.*

The problem thus raised requires, first, a criticism and interpretation of each of the modes of 'realizing' or 'finding-real' similar to that given above to thought. We apprehend reality *perceptually*, we realize it *emotionally*, we postulate it *ethically* and *religiously*, we live it *mystically*, we contemplate it *aesthetically* — all these must have the same thorough criticism and estimation that we accord to the true and the useful, which are the rationalist's and voluntarist's special modes. And the problem of Real Logic becomes that of finding the 'logic' of the adjustments of these modes of the real, each having

<sup>1</sup> By a similar method it is also shown that the resort to *practice* (as in Instrumentalism and Pragmatism) also issues in an insurmountable dualism — that between *facts and ends*. 'Reality' is not exhausted in that which is found practically satisfying.

its own place and meaning, in the final 'real' significance of experience. As Epistemology—that is a theory of the objective reference of knowledge—has *its* logic in the machinery of discursive thinking, and Worth-theory has its logic in the adjustment of means to ends, so each of the other modes of finding the real has a 'logic' of *its* operation in the economy of experience as a whole.

This study has led the writer to certain conclusions in accordance with which he finds the unifying mode of experience to be in its type that of *aesthetic contemplation*. He has presented in a preliminary way certain of the grounds for this conclusion, as well as certain implications of it, in an article entitled 'Knowledge and Imagination' in the PSYCHOLOGICAL REVIEW, May, 1908 (especially pp. 189 ff.) from which the following quotations are made (somewhat modified): "In the aesthetic construction we find a mode of imaginative cognition which is motived not by the interest of extending knowledge nor by that of seeking satisfactions or working practical effects. It is a way of treating a content which we may properly describe as both *over-logical* and *over-practical*. The interest involved is intrinsic, as opposed to the theoretical and also to the practical." . . . "The outcome of my investigation is that in the aesthetic mode of experience, so defined, we have the only inkling of the way that the self-reality of inner control, which is the postulate of the voluntary and worthful, and the thing-reality of external control, which is the postulate of knowledge and truth, can in the process of experience come together, after having fallen apart in the development of cognition." . . . "The protest of the aesthetic imagination is always against partiality as among the modes of 'real' meaning. Its own ideal, on the contrary, is one of completeness, of reunion; it gives the 'real' which is absolute in the sense that its object is not relative to—and does not fulfill—one type of interest *only*." . . . "If we use the word 'contemplative' to describe the cognitive aspect of the aesthetic consciousness, it should be given this full meaning. The self 'contemplates' a content when it reads it as *ideally truthful and so real for knowledge*, and also as, in its own mode and meaning, *ideally worthful and so real for will*, and in this union of controls, the earlier mediation of 'remote' realities gives place to the *immediateness of the real in feeling*." . . . "The object of contemplative interest is thus not only an object, but an object that embodies and completes the self. The self is realized in it, and the experience becomes one that may be called absolute in certain well defined senses" (explained in the article from which this is quoted). . . . "Allowing each mode of psychic function its chance

to make out what 'real' it can in its own way, we find that the æsthetic mode of realizing gets the only meaning that can be called in any intelligible sense absolute. The word 'realize' as popularly used indeed suggests a more adequate experience than that of the 'finding real' of logical proof or the 'assuming real' of practical life."<sup>1</sup>

<sup>1</sup> It may be remarked that Plato's theory of Ideas is a 'real logic' in this sense, inasmuch as he attempts a 'comparative morphology' of ideas or meanings with reference to ultimate reality. Ideas are real, things are mere semblance (shadows, *oikai*). In an important sense, also, he finds the approach to the most real in the æsthetic experience.

The article referred to (*PSYCHOLOGICAL REVIEW*, May, 1908) summarizes certain of the principal positions of volumes I. and II. of my work, and shows the connection between the earlier stages of imaginative cognition (in which the quasi-æsthetic or 'semblant' type of immediacy appears) and the æsthetic proper.

## PSYCHOLOGICAL LITERATURE.

### JUDD'S PSYCHOLOGY.

*Laboratory Manual of Psychology.* CHARLES HUBBARD JUDD, Professor of Psychology and Director of the Psychological Laboratory at Yale University. New York, Scribner, 1907. Pp. 124.

*Laboratory Equipment for Psychological Experiments.* C. H. JUDD. New York, 1907. Pp. 252.

These constitute volumes two and three of 'a series of text-books designed to introduce the student to the methods and principles of scientific psychology.' Volume one has been reviewed in this BULLETIN, April 15, 1908.

Volume two contains directions to students for the performance of twenty-five typical exercises in experimental psychology. Volume three, which is virtually an instructor's manual, contains an account of the apparatus which may be employed for this purpose, and a list of demonstrations to accompany volume one. The two laboratory volumes have been purposely dissociated because the same exercise may be conducted with a variety of apparatus, and the selection of this apparatus is left, in the main, to the instructor.

The general plan for the use of the course is as follows: the exercises are undertaken only after an introductory course in psychology, and are executed preferably by the group method, *i. e.*, small classes or sections of large classes work, usually in pairs, upon the same problem at the same time, and meet subsequently for the comparison and discussion of their results. Each exercise is designed to occupy one laboratory period of two to two and a half hours. The student finds in his manual a brief statement of the purpose of the exercise, and a very general account of the conditions under which the observation is to be made. The instructor supplies the needed materials and explains the use of the apparatus. After the exercise is concluded, the student attempts to answer a number of questions found in his manual. He may also undertake related problems which are sketched for each topic, and may seek further enlightenment on the problem by use of the one or two reading references which conclude the exercise.

The twenty-five exercises fall roughly into four groups — ten exercises upon sensation and perception, of which the first five deal with

vision, seven exercises upon movement and action, one of which is devoted merely to the acquisition of technique, three exercises upon practise, distraction and fatigue, and five exercises upon the 'higher' mental processes, such as memory, attention, esthetics, etc. In contrast with most laboratory manuals, the first exercise is a *quantitative* study of visual *perception*—the Müller-Lyer illusion: this exercise is put first because it is judged to be typical of laboratory psychology, to be well adapted to quantitative work, and to be productive of closely similar results for all observers. The remainder of the exercises upon vision deal with indirect color vision, after-images, color mixture, the monocular estimation of size and distance (accommodation), and binocular space perception (double images, stereoscopy, fusion and rivalry). There follow two exercises in audition (binaural localization, fusion, pitch discrimination, 'interval sense'), two exercises with cutaneous stimulation (punctiform stimulation, localization, and esthesiometry), and an examination of sensation intensities (Weber's law and the limen for auditory acuity) during which the student is introduced to the more familiar psychophysical methods.

The second group of experiments begins with the technique of the graphic method, and then treats of the alteration of circulation and of muscular tonicity and coöordination under various conditions. Attention is given chiefly to pulse, respiration, tremor, the planchette, strength of grip, tapping, line-drawing, simple and complex reaction-times, and an analysis of writing movements. The last-named experiments constitute a novel feature in a drill-course: like several other exercises, these reflect the author's personal interests and the trend of research work at Yale, but necessitate the use of rather elaborate apparatus. It may be doubted whether the average student will get much psychology from them.

The third group is designed to reveal the nature of certain important factors which condition all experimentation, viz., practise, distraction of attention, and fatigue, and, incidentally, to show how the experimental method may be applied successfully to the more general aspects of mental life. Practise is studied, first on the side of impression, by showing the importance of sensory control (reproduction of a drawing, target-practise, singing a given pitch), and secondly on the side of expression, by experiments with mirror-drawing, rapid tapping, and card-sorting. Tapping is also employed, in conjunction with other activities, simultaneously executed, to study the nature of distraction.

The last section gives directions for the study of memory after

Ebbinghaus' method, of the fluctuation of attention by the use of equivocal figures, retinal rivalry and Masson's disc,<sup>1</sup> of the range of attention, curiously by the complication experiment, tachistoscopy, etc., and of visual esthetic appreciation by exercises with the golden section and the balance of forms; it closes with a brief statement of Külpe's experimental study of the discrimination between subjective and objective visual experiences by the method of faint illumination.

In appraising these manuals, it must be said at the outset that they are bound to be of service in the advancement of experimental psychology; of how much service is another question. We now have available in English the simple exercises of Witmer in his *Analytical Psychology*, Seashore's recent *Elementary Experiments in Psychology*, Sanford's well-known *Course in Experimental Psychology*, Judd's two-volume *Manual*, and Titchener's exhaustive four-volume *Experimental Psychology*. These books vary in scope and general type of treatment: each has its sphere of usefulness. It will depend upon the instructor, the length of the course, the maturity of the student, and the laboratory equipment, just which one of them is employed. The expert instructor is likely to select his experiments, apparatus, and methods from several of these books, as his judgment dictates; the poorly trained instructor will, I suppose, follow as closely as he can the policy and precedent of the laboratory in which he himself worked.

Were the present writer conducting a laboratory course, he would find Judd's *Manual* useful mainly as an accessory treatise for consultation and for occasional suggestions as to variations of apparatus and method, though certain of the experiments in groups three and four might be selected for use: the remainder have been more extensively and more carefully treated elsewhere, notably, of course, in Titchener's *Manuals*. Incidentally, no one versed in modern experimental psychology can fail to note the almost studied manner in which Judd avoids reference to, or acknowledgment of, the service which these volumes are rendering in the development of the science.

It is Judd's policy, as we have noted, to discuss apparatus in a separate volume. The reviewer has been puzzled to know just whom this volume is to benefit. In the case of a young teacher who has had the benefit of the Yale training, it is to be assumed that general

<sup>1</sup> None of these methods affords an adequate and objectionless illustration of fluctuation: even Wundt, the most ardent champion of fluctuation, has referred the demonstration by equivocal perspective to peripheral factors; retinal rivalry gives merely an alternation of two supraliminal stimuli; while Masson's disc has been superseded by Ferree's arrangement.

familiarity with instrumentation and technique have already been acquired, and the volume on equipment would therefore serve merely for the refreshing of his memory. In the case of the teacher who has had no adequate training at Yale or elsewhere, one is tempted to say at the outset that he has no business teaching experimental psychology : but suppose, as sometimes occurs, this duty has been thrust upon him, as in a case which recently came to my notice in which an assistant in physics was appointed professor of experimental psychology in a normal school, and given \$300 to start a laboratory, will Judd's book on equipment enable such a man to purchase and manipulate the requisite apparatus? My own opinion is that it will not. My point is that Judd would have done the struggling teachers of the science more benefit if he had prescribed a definite piece of apparatus for each experiment, and had carefully discussed the use of this piece, and shown wherein lie its difficulties.

Let me illustrate by reference to Exercise VII. This exercise prescribes for one period (it seems to me enough for two weeks' work), tonal fusions (13 combinations), fusions with variations in the intensity of the components (6 combinations), pitch discrimination (2 standard pitches), and mistunement of intervals (3 standard intervals) : to these are added as investigations which 'should be undertaken,'—difference tones, counting beats, the pitch of noises, the highest and the lowest audible pitch. When, now, our poorly trained instructor consults his equipment book, he is told that the prescribed exercises *may* be done with Quincke's tubes, with a chromatic pitch pipe, with organ pipes, with the Appunn tonometer, the Stern variator, the sonometer, or with weighted tuning forks, including accessory resonators and tubes. Of the many pits and snares that confront the users of any one of these instruments or of their less obvious defects, little or nothing is said. Thus, the chromatic pitch-pipe which is mentioned for the production of tones of desired pitch (probably following the work of Gilbert) has an error of four or five vibrations. On the other hand, the series of simple discrimination forks, which Seashore has found so serviceable and which is perhaps the best simple apparatus for this test, is not mentioned at all.

Both of the volumes are freely illustrated, but many of the cuts are so reduced in size that the lettering cannot be deciphered, *e. g.*, Fig. 51 in Volume two. There are a few typographical errors, *e. g.*, 'one tone' for 'two tones,' Vol. III., p. 115, Bergströme for Bergström, p. 226 and elsewhere.

The dismissal of experiments in taste and smell with the bare

statement: "investigations of taste and smell have also been made. These senses are of so slight importance in human life that these investigations have more physiological importance than psychological" (p. 53) is rather startling, for smell embraces more sensory qualities than vision and audition combined; smell and taste have obvious functional significance, and their investigation is full of psychological interest.

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### WITASEK'S PSYCHOLOGIE.

*Grundlinien der Psychologie.* STEPHAN WITASEK. Leipzig, Dürr, 1908. Pp. viii + 392. Mk. 3.

This book is well described in its preface as a 'kurze . . . dabei aber doch streng wissenschaftliche Gesamtdarstellung' of the present status of psychology. It is written from the well-defined standpoint of the Meinong school; and its greatest significance is that it strenuously upholds and carefully formulates the non-sensationalist theory of consciousness. Professor Witasek distinguishes between 'Psychologie des Geisteslebens' and 'Psychologie des Gemütslebens.' Under the latter head he gives fifty pages to the discussion of feelings and desires (*Gefühle* and *Begehrungen*) as against the two hundred odd devoted to sensational complexes (*Vorstellungen*) and thoughts. His important teaching that judgment, comparison, recognition and the like include unsensual factors is enforced by over-elaboration of detailed analyses which are often questionable.

A thoroughly helpful general distinction is that between the description and the explanation of the psychic fact. Witasek recognizes both the physical or physiological and the psychological explanation. In the opinion of the writer of this notice, he makes good his useful contention that the psychologist may discuss physical and physiological facts without espousing any one of the metaphysical theories of parallelist or of interactionist. (Cf. p. 103 *et al.*) Other significant teachings of the book are the following: the distinction (pp. 171 *seq.*, 187 *et al.*) between the sensational consciousness of space (*Raumempfindungen*) and the consciousness of space in general (*Raum überhaupt*); the distinction (p. 229) between the *Selbständigkeit*, or self-sufficiency, of sensations and the *Unselbständigkeit* of unsensual elements of consciousness; the teaching (p. 337) that there are no objectless emotions; the observation (p. 306) that abstraction is a form of attention.

In the opinion of the reviewer the book has one radical defect of

theory. While rightfully insisting that psychology is more than a study of psychic contents, or mere ideas, Professor Witasek refuses the true alternative to this theory, the conception of psychology as study of the self, or I. He discards the hypothesis for the conventional reason: because he supposes that by *Ich* must virtually be meant spiritual substance in the sense of Locke. Witasek concludes that a complex idea (*Vorstellung*) may possess all the characters claimed for the self; but he utterly fails to take account of the 'uniqueness' of every self, the character which would make me one self and you another even though my ideas were precisely similar to yours. He lightly sets aside also the appeal to introspection to verify the statement that every idea is the idea of some self, by arguing (p. 65<sup>2</sup>) that only a verbal necessity demands the admission that each idea implies a self. This argument is fraught with peril for Witasek's teaching, since the assumption of the essential correspondence between language and psychic fact lies at the basis of many of his characteristic doctrines. It should be added that at many points, and especially by his teaching about the psychic act and by his conception of judgment, Dr. Witasek seems, like so many psychologists, to imply the existence as basal fact of consciousness, of the self, or I, whom overtly he leaves out of account. (Cf. pp. 100, 231, 350<sup>2</sup>.)

The present reviewer finds real difficulty also in Dr. Witasek's doctrine of the 'disposition.' Though he defines dispositions (p. 86), in agreement with Meinong, as cases of causal relation (*Kausalrelationenfälle*) he certainly does not avoid the danger of hypostatizing them, of treating them after the fashion of the old faculty psychologists (*e. g.*, on p. 313).

At several points, besides that already noticed, one may question the proportionate allotment of space to different topics. On the whole, there is a tendency to emphasize details about the physical stimulus at the expense of physiological fact and theory. Color-theories, for example, are inadequately treated: Müller and Franklin, to name no others, are not even mentioned. And though the copious references to recent experimental literature constitute one of the great advantages of the book, the very brevity of these references makes them sometimes almost futile and at other times misleading. In truth, one can refer only with tolerant amusement to the intense provincialism of Professor Witasek's bibliography. He cites two hundred and three titles—of which one hundred and seventy-nine refer to books and papers in German, fifteen to French writings, nine to English writings, and one to a Latin monograph by a German author.

Of the one hundred and nineteen authors to whom he refers, twelve are French, seven English, seven American and one Italian; but ten of the papers of these foreign authors are published in German. Witasek does not even avail himself of the support to be found in the work of contemporary American and English psychologists for the anti-sensationalistic conception of psychology.

The book as a whole may be recommended confidently to all who interest themselves in those theoretical discussions underlying any fruitful applications of psychology. It is written in rather unilluminated and involved style, but it repays study.

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### PSYCHOPHYSICS.

*Lehrbuch der psychologischen Methodik.* ALFRED LEHMANN.  
Leipzig, O. R. Reisland, 1906. Pp. vi + 131.

The author proposes to give a manual of psychophysical measurement methods for the use of students with little or no mathematical training. Complicated demonstrations are avoided for this reason and the text of the book is confined to the description of the methods of calculation. The hypothesis of the Gaussian law is not made, because the author believes that we have to deal in most psychophysical problems with variable errors which cause asymmetrical distributions.

A quantitative psychological measurement is possible under either one of the following conditions. If a psychical state  $P$  depends on a physical condition  $R$  which admits of quantitative variation in such a way that  $P$  undergoes quantitative or qualitative variations if  $R$  varies, then it is possible to find a mathematical relation between these two phenomena and we call  $P$  a function of  $R$ . If, on the other hand, a psychical state  $P$  influences an external condition  $B$  in such a way that  $B$  assumes different values when  $P$  undergoes quantitative or qualitative variations, then we call  $B$  a function of  $P$ . The object of psychophysical experiments is to find series of the magnitudes  $P$  and  $R$  (or  $B$ ), so that every element of one series is adjoined to a certain element of the other. These results must be subjected to a mathematical treatment in order to eliminate errors and to find, if possible, the nature of the function which exists between  $P$  and  $R$  or  $P$  and  $B$ . The scope of psychophysical measurement methods as defined by Lehmann is wider than that of the usual definition, in so far as it covers not only the measurement of sensation but also all the problems which admit of an exact treatment, as *e. g.*, the measurement of association and of memory.

The book consists of two parts, the first of which treats of the errors and their elimination, and the second of the methods of psycho-physical measurement. The errors may be constant, accidental or variable. Constant errors may be eliminated by a proper arrangement of the experiments, if they are of the same magnitude and of opposite sign in two sets of experiments. The space error is an example of a constant error which may be eliminated in this way, whereas the time error has different sources so that in some cases it may be eliminated and in others not. Accidental errors follow the law of Gauss and may be eliminated by calculation. The chapter on variable errors is a short description of the method of interpolation by means of Newton's formula (the method of differences); the reader will find this chapter a handy and useful introduction to the use of Newton's method. This chapter is followed by some remarks on setting up an algebraic equation by the method of differences and on finding the most probable values of the constants of an equation by the method of least squares. The latter procedure is illustrated by an example on inhibition and reinforcement of sensations of pressure, which is taken from the author's 'Beiträge zur Psychodynamik der Gewichtsempfindungen.' Lehmann uses in his description of the method of least squares the term *condition equation* where the term *observation equation* ought to be used.

The second part of the book contains the description of the methods which serve for the measurement of association, of sensation, of inhibition and reinforcement, of reaction time and of energy. The presentation of the matter is clear and practical, and one finds a great number of useful hints as to the advantages of different ways of approaching a problem. Lehmann gives three methods for the measurement of sensation: the method of limits, the method of equal appearing differences and the method of constant stimuli, whereas Fechner's method of average error and the method of Lipps meet with an unfavorable judgment. The author describes three forms of the method of constant stimuli, only two of which were known before (Müller's method and the so-called abbreviated form of the method of constant stimuli). The third form, the complete method of constant differences as Lehmann calls it, consists in an interpolation and adjustment of the data. This method does not make any assumption about the law of distribution. The data of experiments on simple reaction time are treated by the method of the curves of distribution as suggested by Alechsieff and Bergemann, whereas the treatment of complex reactions is shown on some results of the late Dr. Buch. The chapter on

measurement of energy is very short and its topic is confined to Vogt's experiments and to Lehmann's ergographic experiments on inhibition.

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### ÆSTHETICS.

*The Aesthetic Experience: Its Meaning in a Functional Psychology.* A Dissertation. ELIZABETH KEMPER ADAMS. The University of Chicago Press, 1907.

Interest attaches to this monograph of Miss Adams' not only because of an increased interest in æsthetics in general but the rather because it represents the first attempt to extend the functional method of interpreting experience, as the several writers of the Chicago School interpret the term 'functional,' into what would appear, in the light of current discussion, its most difficult field. Miss Adams fully appreciates this fact and rightly concludes that the æsthetic experience is to be regarded as a sort of 'test case' of the functional position in general. Professor Angell has already pointed out that logic, ethics and æsthetics are but systematic developments of the problems that belong primarily to a functional psychology, or, conversely stated, a functional psychology, if not estopped, must issue in a logic, an ethics and an æsthetics. The sort of logic that results from the attempt to apply the functional method to the higher thought processes is to be seen in Professor Dewey's *Studies in Logical Theory*. Doubtless the same is true of Dewey and Tuft's *Ethics* which has just come from the press. In this monograph of Miss Adams' we are presented with the programme of 'pragmatism in æsthetics.'

Miss Adams' description of the functional position and method is faithfully done and there is no need of repeating it here. The real test and standard of any conscious experience, she says, reside not within itself but in the conduct to which it leads. Such description of conscious experience tends to break down the hard and fast distinction between psychology and the normative or valuational disciplines. All forms of consciousness whatever are possessed of meaning, of reference to something beyond, and the normative disciplines represent only the most conspicuous instances of such values. In short, consciousness is but the registration of values. But as evaluational, consciousness faces both ways, in other words, has both a backward and a forward reference. In every situation there is just so much of the past as is needed for the efficient control of the matter in hand. The reshaping and the resulting elimination and synthesizing of this ma-

terial drawn from the past proceed under the guidance of the emerging end. This end, at first bare, is enriched and defined through the intermediate survey and selection of past experiences. This end as object does not merely happen to be present but is there because it is the center of a cluster of specific activities. It is indeed a construction of those activities, never a mere external given. It marks a certain point in their interrelation and reorganization.

Thought arises only with the polarization of consciousness and subsides when means and end or ends are brought into some form of coalescence. Thus from immediacy to immediacy represents the whole of thought. It is wholly instrumental in character. It arises with the collapse of habitual control and finds its function in the transformation of the disturbed situation so that action can be resumed. Reflection, Miss Adams says, always arises as a method of dealing with some hitch in practice and is, in itself, activity of the most intense kind. As such it is to be set over against the action that follows upon the construction of this content.

Two kinds of conscious experience are therefore to be distinguished—immediate or constitutive and mediate or reflective. The latter bears a relation to conduct different from that of the former. By immediate or constitutive experience, Miss Adams means an experience that does not polarize itself, that is, a situation in which means and end follow close upon one another. We do the thing before we know it. There is no sense of effort. The experience is one of the happiest spontaneity and there goes with it the highly pleasurable sense of the putting-forth of energy. In a word, immediate experience is established coördination. The æsthetic experience, according to Miss Adams, is to be ranged on the side of immediate rather than reflective experience, and she finds the characteristics of the æsthetic experience in her analysis of what she calls the immediate or constitutive type of experience. She therefore reaches a definition of the æsthetic experience as a "certain type of concrete experience, having a high sense of immediate and specialized value inhering in a more or less definite object and possessing a strong and pleasantly colored 'feeling-tone.'"

The problem now arises as to the place of the æsthetic within the thought-process as thus described. According to Stuart, also of the Chicago School, the æsthetic is post-judgmental, while with Witasek it is pre-judgmental. According to Miss Adams the æsthetic arises as the culminating stage of the moment of reconstruction and is the mark of a successful issue. It appears, she says, toward the

close of intellectual reconstruction, is a sign that the reconstruction is complete, or at least sufficiently advanced for service as a guide to outward action and is of a pleasant emotional tone. Without some such type of experience it is difficult to see what would be the determining point for the cessation of reflection. As the 'pause of satisfaction' of Professor Royce, and one can add the 'perfect moment' of Miss Puffer, it denotes that means and end hitherto polarized have been once more consolidated, that the breach in experience has been healed and that conduct may go on modified and enriched through the intervention of thought. On a later page she says that the æsthetic experience marks the attainment of a more complete reality. In such a reconstructive experience, she continues, we have for the first stage what approaches a state of pure objectivity, the temporary disappearance of all definite objective reference with regard to the specific interest on hand. In the second stage we have the actual empirical self set over against the data that it is handling; and in the third stage we have the identification of the self with the new object and the blending of both self and object in the total reality. Here we have an approximation to the original undifferentiated continuum and to the original subjective and ejective stages. This last stage is the 'æsthetic moment.'

Moreover, the 'æsthetic moment' is the most entirely socialized moment in consciousness. The æsthetic experience rises in a social situation and in turn serves social ends. The reality of the æsthetic experience according to Miss Adams is essentially social in its implications and effects. It is only in connection with the social character of the æsthetic that the categories of objectivity and universality get more than a merely formal significance. This conclusion is in perfect agreement with that of Professor Tufts who holds that the æsthetic categories are to be sought for in social psychology. In the æsthetic experience, Miss Adams concludes, consciousness is not self-consciousness, and is social in the fullest psychological sense of the term. Art therefore is social in character and must necessarily perform a social function. Not art for art's sake, but art for society's sake, represents the outcome of the monograph.

But this conclusion subordinates the æsthetic experience to an experience of a practical character. Such procedure, however, is not new in the world of thought. The failure of current and past theories of the æsthetic experience is to be found in the common attempt to subordinate it to one or the other of the two recognized types of experience and thus place upon it the very limitations from which the æsthetic experience seeks always to disengage itself. To make art

social or practical in character means to *attach* to this unique type of experience the very motives from which it seeks to *detach* itself. Art must necessarily be common, that is, social in character, but the aspect of universality is found in the material employed, which is already universalized in thought, while the æsthetic experience as such represents the most complete and immediate personal appreciation.

One cannot but wish that the section entitled, ‘Some Philosophic Implications of the Æsthetic Experience,’ had been longer. For while summing up what has already been achieved, Miss Adams throws out some suggestions of a more satisfactory theory of the æsthetic experience. Here the ideal aspect of æsthetic experience is recognized in the statement that the new object in terms of which experience may be reintegrated is looked upon as if already constructed. Whether we call the new object a concept or an æsthetic construction depends wholly upon the point of view from which we regard it. The concept is essentially æsthetic. But the æsthetic moment has two functions. In addition to its being a sign of completed reconstruction and a signal for the resumption of action, it serves also as a sort of ‘emotional deposit’ which carried over becomes the basis of new experiences, mediate or immediate. Moreover, the æsthetic experience is now recognized as a distinct type of experience and set over against both the ethical and the logical. The last named types of interest represent experience in the making, that is, experience under active reconstruction. In both alike consciousness is divided, that is, dualistic; subject and object fall apart, while means and end are in state of perpetual conflict. Each involves the æsthetic, but both alike lack that detachment, that unmistakable glow of intellectual absorption and achievement in the satisfaction of moral victory which characterizes the æsthetic. The æsthetic does not attach itself to any one system or type of thought but is rather the basis and stimulus of many possible systems and types. In short, the æsthetic becomes a reservoir of experiences.

The reviewer is unable to harmonize the conclusions of the final part of the monograph with the preceding parts. In the earlier parts the æsthetic seems to be but a sort of accompaniment of unimpeded action, the index of established coördination, while in the last part it becomes the basis upon which all higher construction and interpretation proceed. To the reviewer the latter seem the more adequate interpretation of the nature and function of the æsthetic and is in essential agreement, as the author herself recognizes, with Professor Baldwin’s ‘æsthenomic idealism.’

W. D. FURRY.

*Psychologie und Aesthetik.* THEODOR LIPPS. Archiv f. d. g. Psychologie, 1907, IX., 91-116.

The author discusses the question whether esthetics ceases to be a branch of psychology if it is admitted to be a *normative* science. He denies this. There is no fundamental difference between esthetic law (norm) and natural law (norm) except this, that the things which are governed by esthetic law are animate things, are conscious of the processes described in the law, whereas the things governed by natural law are unconscious. A science does not prescribe, but only describes the facts. The prescription of a norm belongs to 'reason,' with which neither psychology nor esthetics are identical, although both are sciences about reason. One may therefore regard esthetics as 'applied' psychology, applied to the comprehension of the facts embodied in the history of art.

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#### FEELING AND ATTENTION.

*Lectures on the Elementary Psychology of Feeling and Attention.*

EDWARD BRADFORD TITCHENER. New York, Macmillan, 1908.

Pp. vii + 404.

"The system of psychology rests upon a three-fold foundation: the doctrine of sensation and image, the elementary doctrine of feeling, and the doctrine of attention" (p. 3). In a most scholarly and able manner Professor Titchener treats of the last two. One must read the book itself to appreciate the openness and extent of the discussion. A brief review can only give a somewhat barren outline of the whole. After a brief treatment of the attributes of sensation Professor Titchener goes into a detailed explication of the characteristics of feeling and attention. After presenting a number of criteria by which a feeling may be judged the author gives the following: "Affections lack what all sensations possess, the attribute of clearness. Attention to a sensation means always that the sensation becomes clear; attention to an affection is impossible" (p. 69). The three-dimensional theory of Wundt is not upheld. Pleasantness and unpleasantness rather are the qualities of affection which can stand the test of scientific criticism and analysis.

As affection is characterized by lack of clearness, so sensation is marked by a difference in the levels of clearness which are present. Attention is the mental state of greatest clearness. The rest of the

field in such a case is obscure. Accommodation will facilitate this state of clearness. Less time is taken if there exists a predisposition towards a stimulus. As attention is focused more closely the field becomes more narrow till a maximum of from three to six objects are grasped in a single unity. Persistent attention is marked by a rhythm of fluctuation in which the field of clearness becomes subject to variation in the degree of clearness. A means of testing the strength of attention is by distraction. Attention is always present when feeling exists. "We may attend without feeling, but we cannot feel without attending. There is a fairly close parallel between the degree of clearness and the degree of pleasantness-unpleasantness" (p. 302).

No one will deny that the facts as presented with regard to attention and feeling are correct, but cannot Professor Titchener's words with reference to the motor aspect of attention be applied to his own interpretation of attention as sensory clearness? He says, "I have always regarded and I probably shall always regard, the motor interpretation of attention as one-sided" (p. 309). Sensory clearness as an aspect of attention will be readily granted, but is there nothing more to be found? Are there no other factors, as ideal reinforcement, motor control, etc.? Is not, in short, the whole process a sensorimotor, rather than a purely sensory one? Take, for example, the narrowing of the sensory field. Cannot this be considered as a quantitative change due to such processes? Cannot, too, the clearness of the situation be taken as a quantitative change in the situation due to ideal and motor processes? We cannot afford to neglect the experimental and scientific work of Münsterberg and Campbell (*PSYCH. REV.*, Vol. I.), of Jastrow (*Am. J. of Psych.*, Vol. IV.), of Lindley (*Am. J. of Psych.*, Vol. VII.), of Baldwin (*Ment. Dev.*), of W. McDougall, and others. The quantitative and the qualitative changes in the given field during attention are evident, but should this preëempt the field to the exclusion of other processes equally prominent? Moreover, clearness in itself means nothing without the motor attitude which gives it meaning. The experiments of Binet, Barnes, etc., show the importance of motor attitudes and controls, and the genesis of meaning emphasizes similar elements (see Baldwin, *Gen. Logic*). It is a question, indeed, whether the motor attitude as developed by actual control on a previous occasion is not the factor which determines the degree of clearness which is possible, the extent of the totality which is apprehended, and the general limitations of the given field. Why, for example, should a knife and its handle form the center of a field of attention, if not because it has

been outlined by previous motor control, used as a totality, and applied by means of motor coöordinations? If the motor aspect of attention is one-sided, and if, as I venture to suggest, the sensory aspect is equally one-sided, is not the sensorimotor view more correct?

The entire treatment of attention as sensory clearness as set forth by Professor Titchener, however, is the best which has appeared thus far. His unbiased discussion of the leading authorities and his interesting style render the book worth reading apart from its psychological value, while the list of authorities which is given makes the volume probably the best of its kind for the research student.

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#### EMOTION.

*Les inclinations, leur rôle dans la psychologie des sentiments.* G. REVAUT D'ALLONNES. Paris, Alcan, 1908. Pp. 228.

The main object of this work seems to be to establish a distinction between inclinations and emotions. Inclinations, emotions and passions, according to the author, are three species of *sentiments*. By an inclination he understands, extending the usual meaning of the word, any more or less complex and persistent system of psychological forces, or the active energy of such a system (pp. 24, 219). Inclinations include instincts, semi-instinctive dispositions and individually acquired habits and needs; they are classified as active, *i. e.*, motor, intellectual, *e. g.*, the preformed systems operative in perception, and emotional. The author is at pains to show that inclinations originally emotional may lose their affective character by habit, intellectualization and constitutional affective incapacity, and that psychologists have admitted the existence of affectively neutral states or elements of consciousness and of non-affective impulses and passions without recognizing the independence of inclination and emotion generally which he seeks to establish. Under emotions he distinguishes *émotions-chocs* and *émotions-inclinations*. The former alone, in his view, are emotions, in the strict sense; the latter, including what are commonly called emotions, are secondary formations in which sensori-motor and intellectual phenomena appear as superstructures on an emotional basis. Emotions proper, he holds, are all of visceral origin and, so far from being as indefinitely various as is commonly supposed, are reducible to three or four primary kinds,—surprise, pleasure, pain and *angoisse* (p. 57). As the first is thought to be neither pleasurable nor painful and possibly only a less intense

form of the last, the whole affective keyboard is reduced to three, named elsewhere (p. 214) *volupté*, *douleur* and *anxiété*. Among the more intense emotions the author includes (as varieties of pain?) hunger and thirst (p. 213). The third kind of *sentiment*, passion, is defined as 'a more or less complete unification of the individuality by an inclination,' in other words, not as a third kind, but as a species of inclination, a 'hypertrophied' inclination (p. 66) or '*inclination-fixe*' (p. 74). Passions, like inclinations generally, may exist without emotion, as, *e. g.*, *passions de tête* and passions of action.

Comparison of the 'peripheral' theory of emotion as variously expounded by James, Lange and Sergi, and Sollier's 'cerebral' theory, which is declared to be simply the peripheral theory with the substitution of more or less conjectural cerebral phenomena for ascertainable peripheral phenomena, leads to the conclusion that the immediate physiological conditions of emotion are conscious organic reactions, that the emotional excitement sets up physiognomic, mimic and visceral phenomena and that the repercussion of these disturbances on the centers affects them emotionally. The author's criticism on the theory as presented by the writers mentioned is that it leaves undetermined the precise relation of the external sensori-motor phenomena to the internal visceral phenomena, and that it constantly confuses emotions and inclinations. He finds new light thrown on the problem especially by the experiments of Bechterew, who, by removing the cortex, with resulting atrophy of the pyramidal tracts, established the existence in frogs, guinea-pigs, cats, etc., of an automatic center for mimetic movements in the *thalamus* and portions of the *n. lenticularis* and *n. caudatus*; and by those of Sherrington who, after sections of the cord which completely isolated most of the body, and even the stomach, heart and lungs, from sensory connection with the brain, found his dogs exhibiting every sign of pleasure, fear, anger and disgust in practically undiminished intensity. Sherrington's experiments would upset the peripheral theory, if we could prove that the animals actually experienced the emotions whose signs they manifested; d'Allonnes, however, is convinced that they experienced no psychical emotion at all. He finds support for this belief in Bechterew's demonstration that all the external signs of emotion may be produced automatically and, since the cortex was wanting, presumably, though not certainly, without consciousness. The possibility is open, therefore, that they may be excited from the brain acting on the automatic center without any emotional consciousness and merely as the expression of instincts and conscious habits. All the facts cited readily lend themselves to this interpretation.

This interpretation, however, can only be conjectural as far as the lower animals are concerned, for they cannot inform us concerning their experiences directly by speech. But it is put beyond question for our author, as far as man is concerned, by the case of a patient under his observation who, while exhibiting all the objective signs of chagrin, indignation, anger, fear, etc., always asserted, with evident sincerity, that she did not feel any of these emotions. The explanation of this emotional apathy is found by him in the patient's almost complete loss of affective, and in particular affective-visceral, sensibility. She is not 'generally anaesthetic'; indeed, her capacity for non-affective sensations is almost normal. But she is, or was at the time of the observation, almost entirely insensitive to pain, hunger, thirst, fatigue, etc., and such visceral sensations as she retained, while serving as signs to guide the life of habit, were devoid of either pleasure or distress. This loss or lowering of affective organic sensibility is held to account also for the patient's defective appreciation of the passage of time, giving rise to the theory that the consciousness of relatively short intervals, as distinguished, on the one hand, from perception of the passing present and, on the other, from conceptual constructions of time, is due to the 'progressive fusion of organic emotions' (p. 171).

The conclusion which the author draws for the theory of emotion is that emotion is due fundamentally to visceral sensations, that visceral phenomena are alone affective and that the so-called expressions of emotion, the play of the muscles of relation, are in themselves not emotional at all. Yet he admits that the latter may modify the affective *timbre* of the internal sensations and, under normal conditions, support them (p. 210). The further conclusion is drawn that inclinations, *i. e.*, psycho-physiological systems, may exist and operate without emotion, though they themselves may even appear as the residua of past emotions, as in the case of the author's patient who illustrates the 'inclinations' of fear, desire and duty without any feeling of their thrill. Finally two laws are formulated which express the process by which psychological systems germinate and decay: they may disappear without involving the disappearance of the derived phenomenon or system; or they may divide and give place to mutually independent systems.

The theory of emotion thus outlined naturally suggests the following criticism. The evidence for it is derived entirely from observation of a single pathological case; everything, therefore, depends on the accuracy of the observation and on the skill with which the facts are interpreted. The facts taken at their face value are briefly these: a

patient (1) manifests all the symptoms of certain emotions on the usual occasions of their appearance without actually experiencing them; these symptoms include changes in respiratory and cardiac movements, as well as tears, sobs, alterations of voice and similar obvious expressions (p. 175); she (2) is generally incapable of any strong emotion: what should and once did move her does not now, as she says, 'touch' her; she (3) is either incapable of, or markedly defective in, the experience of certain organic sensations normally of strongly affective quality, such as hunger, thirst, pain, fatigue and nausea. From (1) it is concluded that the external expressions contribute nothing to the constitution of an emotion, and from (2) and (3) that an emotion consists solely in visceral sensations. Now clearly, to begin with, no basis for this distinction is afforded by the view that the external expressions are instinctive, or, as the author says, phenomena of inclination. It is of the essence of James's theory to regard them as such. They may conceivably all be produced by stimulation of the appropriate automatic centers without participation of the cortex or of consciousness. The question, as related to the James theory, is, were they felt, and particularly were the respiratory and circulatory changes felt, in normal intensity as they occurred? Unfortunately on this point the record is silent. Granting that we are right in assuming that they were, it is evident that in this particular case the sensations were insufficient to constitute an emotion. But it does not follow that they contribute nothing to its constitution in normal cases, where they are combined in one stirring pulse of consciousness with a multitude of other sensations flowing in from all parts of the body and with the various feelings of conflict and tension arising from the incoördination of activities. Indeed, the author himself practically admits this when he allows that they may normally affect the *timbre* of the emotion, for the *timbre* of an emotion is clearly an integral, even if a subordinate, part of the whole complex emotional 'affect.' Nor is the theory any better established on its positive side. In earlier reports of the case the author had spoken of the patient's complete visceral anaesthesia, and he still assures us (p. 136) that her 'somatic sensations' are 'abolished.' A German critic doubted the completeness of the anaesthesia. In reply it is explained that it is only the 'affective tonality, the *Gefühlston*' which is lost, the sensorial, cognitive quality of each sensation being retained. The *Gefühlston* is interpreted, by a strange perversion of its usual meaning, as consisting in a 'gamut of affective, viscero-cerebral sensations: pain, bodily pleasure (*volupté*), hunger, thirst, disgust (or nausea, *dégoût*), *angoisse*, etc.' (p. 186 f.). Now these are the sensa-

tions which, it will be remembered, the author either defines as emotions 'in the strict sense' or declares to be emotions of peculiar intensity. The doctrine, then, that emotions consist in these sensations is purely verbal and nothing is gained for it by exhibiting a patient who is without them. What was wanted was evidence to establish the view that these sensations, severally or combined, constitute, along with other elements demonstrably non-affective, the feeling of, say, love or fear. But of this we have not a trace; all that we have, besides a definition in which the question is virtually begged, is a simple collocation of two facts, the absence of certain organic sensations and the absence of strong emotions. It never seems to occur to the author to ask whether this concomitance may not be due to a common cause, *e. g.*, some sort of central inhibition. It would have been more to the point had a case been presented of the reverse type, one namely in which the patient was completely anæsthetic as regards all the external expressions of an emotion while retaining full sensorial consciousness of the internal changes. If such a patient declared that she experienced the emotion with the same intensity as before the anæsthesia, something could indeed be said for connecting the feeling with the internal bodily changes alone. But even so the evidence would be inconclusive as regards the constitution of the emotion apart from the introspective analysis which is the strength of James's theory, but of which in this modification of it nothing is made at all.

As to the author's doctrine of inclination, it is clearly subordinate to his doctrine of emotion, and the only remark that it perhaps calls for here is that while it seems desirable to think of the more or less durable dynamic formations that determine the life of consciousness under a common term, the term 'inclination' hardly appears the one best suited to the purpose. 'Psycho-physical disposition' is doubtless more cumbrous, but it is at any rate freer from objectionable associations.

H. N. GARDINER.

SMITH COLLEGE.

#### TOUCH AND MUSCLE SENSE.

*Le toucher et le sens musculaire.* VAN BIERVLIET. Année Psychol., 1907, XIII., 114-121.

This article describes some preliminary experiments and conclusions in a general study of the extent and character of the relation between muscular movement and the tactful sense. Starting from the general conclusions of Vierordt, which the author wrongly attributes

to Weber, that the sense of touch of an organ is finer the greater the natural mobility of that organ, Van Biervliet conducted a series of experiments to show a more intimate relation between mobility and keenness of touch. The first experiments comprised a study of the tactual sense of the forehead in twenty individuals who moved this part in a greater or less degree. The subjects were arranged in groups according to the mobility of the forehead. The relative mobility of the forehead was determined by observing its movements during conversation and by counting the number of wrinkles found in it. Aesthesiometer tests were used and the forehead was compared with the tactual sense of the back of the most used hand. The subjects were men of intellectual pursuits who had not trained their hands to any great degree of dexterity in special manual work or in music. The results showed a fraction of  $\frac{99}{100}$  for group 1—that is, for those having the least movable forehead. The coefficient decreases gradually to  $\frac{25}{100}$  in group 10—those having the most movable forehead.

That the relative sensibility of the forehead increases regularly with the greater mobility of the frontal muscles would seem to indicate that the fineness of the tactual sense corresponds not only to the natural mobility of the organ, but to the mobility acquired through exercise. The mobility of a part, therefore, seems to be in some way a 'determining cause and an essential condition' of the sense of touch.

In order to determine if possible how these movements aided the judgment of distance on the skin, aesthesiometer measurements were taken for three regions: the back of the most used hand, the anterior surface of the upper forearm two centimeters above the bend in the elbow, and the forehead. The results show clearly that adding movements increase the fineness of the sense of touch of the organ explored. In the forehead, for example, the sensitiveness for simultaneous contact was 7, for successive contacts 4 and when the subject moved his head 2.

The author concludes that no part is absolutely immovable when being explored. The hand affords an excellent example of this. It is more movable than the arm and perceives more points of contact when apparently unmoved, and when allowed to move it becomes more sensible to points of contact. Furthermore, changes in muscular tension are often observed in the organ explored. All these facts, the author believes, indicate a very vital connection between the tactual and the muscle sense.

ROBERT D. WILLIAMS.

YALE UNIVERSITY.

## REPORTS AND DISCUSSION.

### THE NEW PSYCHOLOGY BUILDING AT THE UNIVERSITY OF CHICAGO.

With the beginning of the present academic year the department of psychology in the University of Chicago takes up its abode in new and commodious quarters, a brief account of which may be of interest to readers of this journal.

The department has been given for its exclusive occupancy a three story and basement stone-and-brick building with a ground plan of sixty by forty feet. This affords upwards of nine thousand square feet of available floor space.

The north half of the basement ( $60 \times 20$  feet) is devoted to a draughting room and shop. The shop will be on a distinctly larger scale than heretofore and after the present year will undertake, under the joint direction of Professor C. H. Judd and the writer, to manufacture psychological apparatus for other laboratories as well as materials for our own use. The south half of the basement is fitted up as a dark-room. Among other devices this room is supplied with a heliostat and an arc light. Either sunlight or artificial light is thus available for color work.

On the ground floor are two large lecture rooms supplied with dark curtains and projection lanterns. The lecture desks, ten feet in length, are fitted with electricity for light and power, with gas and air pressure, while water is immediately at hand. The remainder of the space on this floor is given over in part to rooms reserved for work in the training courses, *e. g.*, a suite for acoustical work, a room for the study of cutaneous sensations, and so forth. The rooms not thus accounted for are used for the storage, repair and care of apparatus.

On the second floor is the department library and a large seminar room for the exclusive use of advanced graduate students. Here each may have his own desk room, lock-drawers for papers, etc. On this floor also are the department offices and a number of additional rooms for work in the training courses; for example, a specially prepared room for work on smell and taste, and a suite for experiments in vision.

The top floor is entirely reserved for research purposes. Fourteen rooms are available, the average size being about twelve feet square. Half of these have sunlight all day, while three have only north light and the other four get the sun at the ends of the day. A small photo-

graphic dark-room supplements the large plant in the basement. All of these rooms are high above the noise and dirt of the street. A dumb-waiter at the rear of the building permits the easy carrying of heavy apparatus up and down from one floor to another.

The electrical arrangements differ somewhat from those installed in other psychological laboratories and promise great convenience and efficiency. Every room has electric lights and plugs from which a direct current can be drawn. Gas is also available in a number of places, although it is not intended for illuminating purposes. Arc lights are supplied to the basement dark-room and to the lecture room lanterns. Electric power adequate for running the lathes and other machines is supplied to the shop. A storage battery of twelve large units is by appropriate connections made available for use anywhere in the building, delivering any amount of current desired up to the limit of its capacity. A circuit for high amperage motors supplies all the rooms where such apparatus may be required. The fourteen research rooms are joined to one another by six circuits so arranged that by a system of plugging one or more circuits may be made to unite any room in the series with any other. Any room may also be connected with the floors below. The system thus permits the maximum of flexibility in conducting experiments where observer and experimenter require to occupy separate and isolated rooms.

A series of speaking tubes unites distant parts of the building with one another, *e. g.*, the shop with the research rooms and with the director's office. Hot and cold water are supplied on every floor, as well as wash-rooms and sinks for cleansing apparatus. Air pressure is also available at a number of points.

The building formerly used as a laboratory, together with the adjacent yard, will be employed hereafter solely for the work in animal psychology. This will obviate the difficulties, hitherto so serious, of keeping animals in a building used for general academic purposes.

With two entire buildings at its disposal the work of the department can be carried on with a degree of convenience and efficiency previously impossible.

JAMES R. ANGELL.

UNIVERSITY OF CHICAGO.

#### 'MAGNETIC SENSE' OF DIRECTION.

So far as I know there has been no scientific investigation of the possible presence of a sense of north-south direction in man. There are some allusions to such a sense in fiction (see du Maurier's *Martian*) and it appears to be a somewhat popular belief.

A friend of mine recently informed me that his son, T. D., aged 5, is able at all times to tell direction. My friend's attention was called to this during a summer trip by the boy's remarking that the street on which they lived at home ran a certain way, which he indicated. As a matter of fact the street runs nearly due north and south. Finding by compass that the boy was right, he has since tested him from time to time in various places, at night, blindfolded, etc., with uniformly correct results. I had an opportunity to test the boy several times with a compass, walking him around blindfolded each time before the test, so that he should lose all direct notion of present orientation. All the results were correct to within a few degrees. When the question is put to him, he motions with his hand in the right direction instantly and without hesitation or taking observations. He also distinguishes correctly north (the direction of the railroad station at home) from south. On account of the boy's bashfulness I was unable to prolong the tests or vary them sufficiently for scientific accuracy. They led me, however, from an absolutely skeptical attitude to one of inquiry.

The problem is offered to those interested in child study as a matter worthy of investigation. If such a sense has been developed in the phylogenetic scale (as suggested by the migration of birds) it may still appear in a rudimentary form in man, and distinct traces may be discovered in childhood which are lost later on in life.

H. C. W.

#### BILLIONS OR TRILLIONS.—A NOTE OF CORRECTION.

In my review of Raymond's *Essentials of Aæsthetics* (this journal, Vol. IV., no. 7, p. 255 ff.) I took occasion to criticize that author for speaking of the vibration rate of light waves as *trillions* instead of using the, to me, more familiar term *billions*. I have just been made aware of the error of this stricture. In comparing the current edition of a standard text-book in psychology with an earlier edition of the same work, I found that in the earlier edition the rates were given as 'billions,' and in the new edition as 'trillions.' This attracted my attention again to the matter, with the result that I discovered the difference in usage as practiced, on the one hand, by English and German writers who term a *million million* a *billion*, and, on the other hand, by American writers who term the same a *trillion*. Besides offering a tardy correction to my review, this note may, perhaps, serve to enlighten some others on this rather confusing variance in usage.

ROBERT MORRIS OGDEN.

UNIVERSITY OF TENNESSEE.

BOOKS RECEIVED FROM OCTOBER 5 TO  
NOVEMBER 5.

*Social Education.* C. A. SCOTT. Boston, Ginn & Co., 1908. Pp. xi + 298.

*De la Méthode dans les Sciences.* H. BOUASSE (and twelve other authorities in the different sciences, DURKHEIM, RIBOT, TANNERY, etc.). Paris, Alcan, 1909 (for 1908). Pp. 412. 3 fr. 50.

*A Theory of Mind.* J. L. MARCH. New York, Scribners, 1908. Pp. vii + 453.

*Buddhism and Immortality.* W. S. BIGELOW. Ingersoll Lecture. Boston, Houghton Mifflin & Co., 1908. Pp. 75.

*Untersuchungen zum Problem der Evidenz der inneren Wahrnehmung.* H. BERGMANN. Halle, Niemeyer, 1908. Pp. viii + 96. Mk. 2.80.

*Neurological and Mental Diagnosis.* L. P. CLARK and A. R. DIEFENDORF. New York, Macmillans, 1908. Pp. xi + 188.

*Cournot et la Renaissance du Probabilisme au XIX<sup>e</sup> Siècle.* F. MEUTRE. Paris, Rivière, 1908. Pp. viii + 651. 12 fr.

*La Philosophie sociale de Renouvier.* R. PICARD. Paris, Rivière, 1908. Pp. 344. 7 fr. 50.

*Grundzüge der aesthetischen Farbenlehre.* E. UTITZ. Stuttgart, Enke, 1908. Pp. viii + 156.

*Die Wirkung von Suggestivfragen.* O. LIPMANN. Leipzig, Barth, 1908. Pp. 169. Mk. 5.

*National Idealism and the Book of Common Prayer. An Essay in Re-interpretation and Revision.* STANTON COIT. London, Williams & Norgate, 1908. Pp. xxv + 467. 10/6 net.

*Questions in General and Educational Psychology.* GUY MONTROSE WHIPPLE. Cornell Study Bulletins for Teachers, No. 3. Syracuse, C. W. Bardeen, 1908. Pp. 108.

*Race Questions and other American Problems.* J. ROYCE. New York, Macmillans, 1908. Pp. xv + 287.

*Psycho-physiologie de la Deuleur.* I. IOTHEYKO and M. STEFANOWSKA. Paris, Alcan, 1909 (for 1908). Pp. 251.

*La Morale naturelle.* J. L. DE LANESSAN. Paris, Alcan, 1908. Pp. 412. 7 fr. 50.

## NOTES AND NEWS.

THE seventeenth annual meeting of the American Psychological Association will be held in Baltimore during Convocation Week, in conjunction with meetings of the American Philosophical Association, the American Association, and other societies. The sessions of the Association will be held on Tuesday, Wednesday, and Thursday, December 29-31. It is probable that a joint session will be arranged with the Section of Education of the A. A. A. S. All titles of papers should be sent to the Secretary not later than December 15.

THE fourth annual meeting of the Southern Society for Philosophy and Psychology will be held in Baltimore during the same week, the exact dates to be announced later. The Secretary should be informed as early as possible of the titles of papers or reports to be offered.

MR. L. W. COLE, recently professor of philosophy and psychology at the University of Oklahoma, has been appointed instructor in experimental psychology at Wellesley College. Professors Hugo Münsterberg and George Santayana, of Harvard University, will lecture on æsthetics at Wellesley College during the coming year.

DR. DANIEL STARCH, instructor in experimental psychology at Wellesley College, has been appointed instructor in psychology in the University of Wisconsin.

DR. CLARENCE VAN EPPS has been appointed lecturer in mental pathology in the department of philosophy and pathology of the State University of Iowa.

OUR attention has been called to the erroneous impression conveyed in a notice of G. Bohn's article on the acquisition of habits by animals (*Année psychologique*, XIII., 170) published on page 238 of the BULLETIN. The article in question is a summary of work by other investigators, not of the author's original results, as would appear from the review.

THE following are taken from the press:

AT the recent third International Congress of Philosophy, held at Heidelberg, it was decided that the fourth Congress will take place in 1912 at Bologna.

AT the University of Michigan DeWitt H. Parker, Ph.D. (Harvard), has been appointed instructor in philosophy, and F. C. Dockery, A.B. (Mich.), and Elmer C. Adams, A.B. (Mich.), assistants in psychology.

PROFESSOR WILLIAM JAMES returned on October 16 from England. He has been lecturing at Oxford on 'The Present Position of Philosophy,' and it is announced that these lectures will be repeated at Harvard University.

PROFESSOR GEORGE T. LADD is giving a course of fifteen lectures on certain psychological aspects of education at the College for Women of Western Reserve University.

MR. F. C. BECKER, assistant in philosophy in Columbia University, has been appointed instructor in philosophy in the University of Illinois.

DR. JESSE H. WHITE, Ph.D. (Clark), has charge of the work in psychology and education in Pittsburgh University during the absence of Professor Edmund B. Huey, who is spending the year in Paris.

PROFESSOR M. STUART MACDONALD, of the University of Fredericton, will give assistance to the department of philosophy at McGill University pending the appointment of a successor to Professor Taylor

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THE

# PSYCHOLOGICAL BULLETIN

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PROFESSOR ROSS'S CONCEPTION OF SOCIAL PSYCHOLOGY.<sup>1</sup>

BY PROFESSOR CHARLES A. ELLWOOD,

*University of Missouri.*

Psychologists will welcome this volume by Professor Ross, who, though not technically of their number, has done brilliant work in establishing sociology upon the results of modern psychology, as his two former books on *Social Control* and *The Foundations of Sociology* abundantly testify. While Professor Ross's book is not the first systematic attempt to deal with the subject of social psychology, as he claims in his preface, since that honor, in English at least, undoubtedly belongs to Professor Baldwin's *Social and Ethical Interpretations*, yet it is a pioneer treatise and as such is extremely interesting and worthy of notice.

In hastily glancing over the book one is struck, first of all, by the fact that it is not laid out on conventional psychological lines. It does not begin with a summary of present knowledge concerning the psychology of the individual, but, after a brief introductory chapter on definitions, it opens with a chapter on suggestibility, followed by chapters on the crowd and mob mind, then by a series of chapters on conventional and customary imitation, and closing with a brief discussion of some aspects of social conflict and public opinion. If one expected that the psychology of human society would include a much wider range of topics than the above, the first impression made by the book would naturally be disappointing; and if one was familiar with the works of Tarde, a further impression would be that Professor Ross has confined himself almost entirely within the lines laid down by

<sup>1</sup>*Social Psychology. An Outline and Source Book.* Edward Alsworth Ross, Professor of Sociology in the University of Wisconsin. New York: The Macmillan Company, 1908. Pp. xvi + 372. \$1.50 net.

Tarde in his *Les Lois de l'Imitation* and other works. This latter impression is confirmed by the author in the preface where he acknowledges his immeasurable indebtedness to Tarde.

But it is not due to Tarde's influence alone that Professor Ross confines his social psychology largely to a consideration of the phenomena of suggestion and imitation, custom and convention. It is due even more to his conception of the subject. "Social psychology," he tells us,<sup>1</sup> "studies the psychic planes and currents that come into existence among men in consequence of their association. It seeks to understand and account for those uniformities in feeling, belief, or volition which are due to the interaction of human beings." This definition necessarily excludes from social psychology the consideration of social variations and changes as such, social unlikeness and conflict not due to imitation, and as the author himself recognizes,<sup>2</sup> also those social uniformities due to instinct, innate racial character, and the influence of a common physical environment. On the other hand, since imitation is the chief means of propagating acquired uniformities in human society, as Baldwin has emphasized, Professor Ross is by his definition confined to a consideration of the social effects of the suggestion-imitation process.

The ambiguity in the use of the term 'social psychology,' as used both by psychologists and by sociologists, deserves attention. As has been elsewhere pointed out by the present writer,<sup>3</sup> the term is used at present in two entirely distinct senses: first, to mean the psychology of the so-called social states of mind of the individual; secondly, to mean the psychology of the social life (interactions of individuals). Now in the first sense, social psychology is evidently a part of individual psychology, being concerned with a problem of immediate experience. In the second sense, it is equally evident that social psychology is but a name for the psychological aspect of sociology. There is, of course, no objection to using the term in this second sense, provided it is understood that such social psychology has the same problems as sociology, being, in fact, but a section of sociology. It is, indeed, but an application of psychology to the interpretation of the problems of the social life. Fully four fifths of all that is written to-day under the name of sociology is such a psychological interpretation of the social life. Only one densely ignorant, however, would claim that sociology and psychology have the same problems. While the dependence of

<sup>1</sup>P. 1.

<sup>2</sup>Pp. 2, 3.

<sup>3</sup>*American Journal of Sociology*, Vol. XIII., pp. 336, 337.

sociology upon psychology is so great that it is properly classed as a 'mental science,' still it is evident that the sociologist in examining the origin, development, structure, and functions of the forms of the social life (interactions of individuals) is getting at something very different from what the psychologist is getting at. Social psychology in the first sense, then, and social psychology in the second sense are two very different things from the standpoint of scientific methodology.

Now Professor Ross does not use social psychology in the first sense; he says expressly in his *Foundations of Sociology*<sup>1</sup> that he regards social psychology as 'the lower story of sociology.' Yet he denies in the book under review that social psychology is but a name for the psychological aspect of sociology. He says<sup>2</sup> that social psychology differs from sociology proper in that it does not include the psychology of groups and social structures. The grouping of men through innate or acquired interests, the formation of social institutions to adjust those interests, are not, according to Professor Ross, phenomena to be dealt with by social psychology. "Social psychology considers men only as coming into planes or currents of uniformity, not as uniting into groups." The ground for this extraordinary division of labor between social psychology and 'sociology proper' we discover only when we consult again Ross's *Foundations of Sociology*.<sup>3</sup> There we learn that the 'social' is what we get from our social environment through the influence of the example of others. In other words, Professor Ross practically adopts Tarde's views that 'the social is the imitated,' although he emphasizes the importance of 'contrary suggestion,' which Tarde also would probably not object to. A few sentences further on, however, Professor Ross inconsistently defines as 'social' "all phenomena which we cannot explain without bringing in the action of one human being on another." We say this is inconsistent, for the influence of one individual upon another surely cannot be reduced to imitation and contrary suggestion. Can communication, for example, which is preëminently a social phenomenon, be so reduced?

Upon the basis of such reasoning Professor Ross turns aside from the examination of the whole process of inter-stimulation among individuals and its effects upon social groupings, structures, and relations, and confines his attention to the suggestion-imitation process, that is, practically to conventional and customary imitation, as alone subject-matter for social psychology. The working of innate and acquired interests in shaping the groupings of men or in leading to conflicts;

<sup>1</sup> P. 8.

<sup>2</sup> P. 2.

<sup>3</sup> Pp. 6, 7.

the expression of instincts and emotions in the interaction of individuals, often determining their relations; the breaking down of customs and conventions by changes in the life-conditions;—these and similar phenomena he practically ignores.

It seems to the reviewer that, in the long run, there can be but one judgment concerning Professor Ross's conception of social psychology; and that is, that it is wholly arbitrary. Social psychology, as a social science, can only mean an application of psychology to the interpretation of the social life. As such, its field is the whole realm of inter-stimulations among individuals, all social phenomena, in other words, in so far as they have a psychological aspect, not simply 'uniformities in feeling, belief or volition' due to conventional or customary imitation. It differs from 'sociology proper' only as the psychological aspect of that science differs from the whole.

This notice has been given up almost entirely to a criticism of Professor Ross's conception of social psychology, because that seems to the writer to be the vital point at issue, not only among sociologists, but also between sociologists and psychologists. As regards Professor Ross's handling of the problems with which he deals there is little fault to find, except that his point of view is dominantly non-functional. His standpoint is social habit, rather than social adaptation. This is again practically necessitated by his conception of his subject, which centers attention upon social uniformities rather than upon social changes. One cannot help wishing that Professor Ross had read to as good purpose the leaders in modern functional psychology as he has evidently read Tarde. Then we should have had a very different book. But as it stands, it is still one of the best studies of custom and convention in any language.

## PSYCHOLOGICAL LITERATURE.

### McDOUGALL'S SOCIAL PSYCHOLOGY.

*An Introduction to Social Psychology.* WILLIAM McDougall.  
London, Methuen & Co., 1908. Pp. x + 355.

Mr. McDougall attempts to present psychology from such a point of view that it may become a technique for the social sciences. The point of view which, in his opinion, will give this value to psychology is that of the instincts. The instinct the author defines as—"an inherited or innate psycho-physical disposition which determines its possessor to perceive, and to pay attention to, objects of a certain class, to experience an emotional excitement of a particular quality upon perceiving such an object, and to act in regard to it in a particular manner, or, at least, to experience an impulse to such action" (p. 29). In this definition and in the discussion that leads up to it and follows it, there is implied the movement of nervous discharge along the afferent paths to the central portion of the nervous system from which the impulses go out to the vital organs and which are the nervous correlates of the conscious emotional experiences. From this central portion of the system also proceed the impulses to the motor tract that give rise to overt conduct or at least to tendencies to such conduct. This description of the instinct has considerable import for the theory of cognitive consciousness and for the theory of the emotion, and we will return to it later.

The author undertakes the difficult task of determining the instincts and their derivatives in the human animal, using three criteria (Chap. 3). These are the identity of a type of activity with one that is to be found in lower forms, the appearance of the activity as a dominant process in pathological cases, and the presence of a specific emotion which he assumes must accompany each instinct as such. The instincts and their corresponding emotions are flight and fear, repulsion and disgust, curiosity and wonder, pugnacity and anger, self-abasement (or subjection) and the emotion of subjection, self-assertion (or self-display) and elation (these two emotions may be called negative and positive self-feeling), the parental instinct and the tender emotion. There follow three instincts which the author conceives have no pro-

nounced emotional accompaniments — that of reproduction, the gregarious instinct, those of acquisition and construction.

The most important feature of this analysis of Mr. McDougall, in the mind of the reviewer, is that it makes the ultimate unit an act rather than a state of consciousness. All consciously formed habits are regarded as in a sense derivatives of these instincts and servants of them. All the motive power of conduct is found in them. All the complexities of thought and action are explained through the complications of the instincts and their stimuli and motor responses. The author recognizes two ways in which the instincts may be modified in themselves, apart from their combination with other instincts. The afferent processes with the accompanying sensuous experiences (the author conceives of these as necessarily perceptions) may be varied — either they may be modified by experience or new stimuli may be actually substituted for old ones; or the efferent processes, the motor phases of the act, may be modified — in the human form almost indefinitely, but slightly in the lower animal. The central part of the psycho-physical disposition, however, remains unchanged. Fear, anger, tenderness, as primitive characteristics of conscious experience are identical no matter what arouses them, or to what responses they give rise. The central phase of the act — the emotional — is subject to development only when a system of instincts or derivatives of instincts become organized about some object, when a sentiment arises. In so far as the sentiment is an affective experience it is a combination of different fundamental emotions. Its permanence and reference to certain objects, however, belong to the organization of these instinctive processes into highly complex and relatively permanent systems of conduct. In this treatment of sentiment and emotion Mr. McDougall follows with some innovations Shand, whose analysis of affective consciousness has been in large measure adopted by Stout as well.

The author's analysis of conduct into acts and of these acts into three constituents — afferent-perceptual, central-emotional, and efferent-motor, gives a convenient scheme for dealing with a number of psychological problems that are peculiarly social. He ranges suggestion, sympathy, and imitation as parallel modifications of perception, emotion and motor response, under social stimulation. Suggestion is the immediate acceptance of a presentation, idea, or belief similar to that of another. Sympathy is the induction of the emotion of another, while imitation implies the transfer of the motor response of one form to another. The mechanism of suggestion is quite inadequately discussed. The definition is as follows: "Suggestion is a process of

communication resulting in the acceptance with conviction of the communicated proposition, in the absence of logically adequate grounds for its acceptance" (p. 97). This evidently is with difficulty applicable to animals, among which suggestion is a recognized phenomenon, and the whole discussion is upon the conditions and degrees of suggestibility rather than upon the nature of suggestion. One feels that the author must be unacquainted with Wundt's classical brochure upon this subject.

In dealing with primitive sympathy — which is for him simply the induction of an emotion from one form to another, and is to be sharply distinguished from the higher social experience that is also called sympathy — Mr. McDougall suggests the possibility of the presence of other afferent paths to an instinctive process beside that which commonly excites it. In this way the motor phase of an instinct may excite the same emotion in another form. The one suffers with the other, because, *e. g.*, the instinct of flight with the emotion of fear may be aroused directly not only by the perception of a dangerous object, but also by the flight, or tendency to flight of another form.

Finally, imitation is discussed under three heads. Under the first, it is referred to the situation just described. The induction of emotion is frequently conceived of as imitation. In the second case the author simply falls back upon motor ideas: "In these cases the imitative movement seems to be due to the fact that the visual presentation of the movement of another is apt to evoke the representation of a similar movement of one's own body, which, like all motor representations, tends to realize itself immediately in movement" (p. 105). Finally the author refers to self-conscious imitation and its relation to admiration. In this same connection the author suggests a solution for the problem of 'playful fighting.' After criticizing other solutions, he assumes a modification of the instinct of fighting which has arisen and been preserved because of its value to the species. The most important phase of this conception of the author's is the derivation of rivalry as a phase of conduct from this modified instinct. "May it not be, then, that the impulse of rivalry is essentially this impulse to playful fighting, the impulse of an instinct differentiated from the combative instinct in the first instance in the animal world to secure practice in the movements of combat?" (p. 114).

Of considerable interest is the author's account of what he terms active sympathy — that state in which one desires that another shall share his emotion, and feels a certain satisfaction in this sharing, which enhances his pleasure and his joy. The explanation of this

arises in part from the primitive sympathy already discussed — the bare induction of the emotions. This however arouses disagreeable emotions as well as the agreeable, and leads to the avoidance of the source of these experiences while active sympathy finds satisfaction even in sharing the sorrow of another. The author finds his explanation for this paradox in the instinct of gregariousness. "The gregarious instinct supplements, as it were, each of the special instincts rendering complete satisfaction of their impulses impossible, until each animal is surrounded by others of the same species in a similar state of excitement. . . . The blind impulse of the gregarious animal to seek the company of his fellows, whenever one of his other instincts is excited, becomes in us the desire of seeing ourselves surrounded by others who share our emotions" (pp. 170, 171). It would be interesting to follow out the admirable analysis of complex sentiments into their constituent emotional parts, and the discussion of temperament and character. Enough has been given however to indicate that the author has an effective tool of analysis, which is peculiarly valuable in dealing with the phenomena of social consciousness.

In the discussion of the growth of self-consciousness (Chap. 7) the author undertakes to show in what manner individuals endowed with the instincts he has discussed attain the consciousness of self and become thereby moralized or socialized. The modification of the primitive impulses takes place (1) by pains and pleasures incidentally experienced; (2) by rewards and punishments more or less systematically administered by the social environment; (3) by experiences in which conduct is controlled by anticipations of social praise or blame; (4) by experiences "in which conduct is regulated by an ideal of conduct that enables a man to act in a way that seems to him right regardless of the praise or blame of his immediate social environment" (p. 181). The description of the earlier stage of development of self-consciousness does not differ materially from that of Baldwin and Royce. The further stages follow naturally from the previous discussion of the instincts, but what renders the account peculiar to the author is the gathering of the whole development about the self-regarding sentiment, which is built upon the instinct of self assertion. The different levels of social and moral consciousness are determined by the degree to which the other instincts with the social consciousness they involve can be organized under the self-regarding sentiment. The problem as stated by the author at the outset is that of developing an altruist out of an individual with egoistic impulses. In the last and much less considerable portion of the book the author makes use

of the different instincts as means of analysis and interpretation of social phenomena — especially in opposition to the analysis of a purely associational and hedonistic psychology. He offers, however, instances rather than a sociological doctrine.

The most disappointing chapter in the book to the reviewer has been that on development of self-consciousness. Though Mr. McDougall comes back specifically to the 'empirical me' and recognizes that the self can arise in consciousness only over against other selves, still the content of consciousness is generally treated as if these other selves existed as representations in the consciousness of the 'me.' There is no consistent psychological treatment of the development of the social consciousness as a whole within which the 'me' appears with no greater reality or immediacy than the *alteri*. The result is that the author places at the summit of his moral ladder the man who finally is able to retire into a noble but isolated self. The social character of morality is shabbily treated in the house of its friends.

Upon the psychological side there are two criticisms, in the opinion of the reviewer, which need especially to be made. One has to do with the relation of the cognitive, and the other with that of the emotional phase of the act to the instinct as a whole. The root of the difficulty is in both cases the same. Mr. McDougall assumes that the peculiar character of human reflective consciousness is due simply to the complication that arises through the freeing of ideas, the association and assimilation of these to each other and to our perceptions and their organization into thought systems. In the same manner he finds in our emotional consciousness nothing but the combination of emotional elements into the systems of sentiments and the creating of 'dispositions' that answer to this organization. The author endows the lowest form, in which instincts appear, with both perception and emotion. His justification for making the stimulation of every instinct perceptual is that the form must 'select' the sensation among competing elements, and that this selective attention implies perception. There is no discussion of this point, but there is also no adequate evidence either in ourselves or in the study of animal behavior for the proposition that susceptibility to one stimulus to the elimination of others implies perception. In fact the decisive ground seems to have been that we may assume that the same tracts of the brain are excited which we regard as necessary to cognition. In a word, for the author, selective stimulation which sets free an instinctive act must be perceptual, and the problem of the function of cognitive consciousness in the evolution of animal life is pushed quite to one side. If we assume, with

the functional psychologists, among whom Mr. McDougall classes himself, that the function of cognitive consciousness has been the solution of difficulties with which the lower animal cannot cope at all, or only by means of the gradual process of natural selection of accidentally successful reactions, this tying up of cognition to the afferent part of the act, simply as a necessary accompaniment, is an abandonment of the whole attempted explanation. Consciousness of a cognitive character must arise within the act to further its success, and not be a mere correlate of an afferent disturbance if it is to have a place in an evolutionary doctrine. In fact all the currents in the instinct run in one direction—from the afferent tract to the central; from this along two paths, to the vital organs, thus giving the nervous correlate of the emotions, and into the afferent tracts leading to motor discharge. There is no indication of the reflection of these different excitements back into each other, and yet the play back and forth of the response and stimulus processes is the whole nature of control, and it is from every point of view probable that the reflective type of consciousness arises in this process of interaction between the different phases of the act. Cognitive consciousness is not a mere characteristic of the sensuous phase of the act, but a derivative of the process by which the act develops through readjustment, in the presence of difficulties. It belongs to the act as a whole. Into sensation enters the motor character of the response, otherwise sense perception could never control reaction. When this control becomes conscious the sensing may well become perception. Without attempting to dogmatize upon the question, one may rest assured that the point at which perception appears must be determined by a doctrine of development that recognizes the functional value of consciousness in the entire act. The same situation obtains in regard to the emotions. The peculiar nature of the emotion lies in the fact that it belongs to the whole state of consciousness, that it reflects into the process of stimulation and furnishes the value content of the object that arises in the situation, that it is related to ongoing activity, but appears only when the activities have been checked. If cognitive consciousness is one phase of the readjustment tendencies to act, emotion is another—the other phase. If this statement is correct, there is no emotion that belongs to an instinct, any more than there is a perception which belongs to its afferent phase. The emotion as such appears only when the activity has been inhibited and a conscious presentation of the whole situation arises.<sup>1</sup>

Again, whether this statement be accepted or not, the emotions must from the point of view of evolution be regarded as having a

<sup>1</sup>Dewey, 'Theory of the Emotions,' *PSYCHOL. REV.*, I., 553; II., 13.

function in the development of conscious intelligence. They must be related to that situation which furnishes the *raison d'être* for higher consciousness, the situation of inhibition, to which the conscious readjustment of the form responds, making by its conscious nature a short cut through the tedious and bungling processes of natural selection. This function seems to be twofold, the one that of evaluation, the other that of communication.

This attack upon the problem of social psychology is very encouraging. It demonstrates at once that the act as a starting point is not only fortunate for this branch of psychology, but must be equally valuable for individual psychology, when the mechanics of the act and the mutual interrelations of its different phases have been more completely worked out.

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#### CUSTOM AND ETHICS.

*A Study of the Influence of Custom on the Moral Judgment.*  
FRANK CHAPMAN SHARP. Bulletin of the University of Wisconsin, 1908. Pp. 144. \$0.30.

This study is one that every student of ethics and of present social conditions will wish to read. Whether he agrees with the author as to methods of inquiry and interpretations of material or not he will be stimulated to consider whether the actual moral life of the present is as well known as writers on the subject are apt to assume. It is likely that many may not agree with the author as to just what significance is to be attached to the material, but the fundamental motive of the inquiry certainly commands assent. Whether the best method is the one here adopted or whether we use indirect methods such as examination of legislation, court procedure, voluntary organizations, political campaigns, business codes, drama, fiction, and other expressions of public opinion or public taste—no one can question the author's claim that we need to investigate the actual moral life about us.

The specific problem indicated by the title was approached by a questionnaire given out to two groups of students in the University of Wisconsin. One group of ninety-three was composed of forty-eight men and forty-five women from the College of Letters and Science; the second group comprised fifty men from the Short Course in Agriculture, none of whom had attended a high school more than two years, the great majority having had only an elementary country school education. The method of examination was to submit a series of casuistry questions for written answers and then to follow up the

inquiry by personal interviews. In general the inquiry aims to discover how far the moral judgments examined seem to be due to custom and how far they have some reasoned basis. In particular the two subordinate questions as to whether the judgments are mediate or immediate, and whether they do or do not fall back on some authority, are relied upon to throw light on the main question. If the judgments are immediate this in so far raises a presupposition of their derivation from custom; if on the other hand they rest on some reason that is forthcoming as soon as asked for, the presumption is that the judgment is not, or at least is not wholly, from custom. The results which emerge are summarized by Professor Sharp as follows: "Of the more than five hundred answers obtained from the 'Hill' students only eleven can urge even a *prima facie* claim to immediacy." "The examination of the members of the Short Course in Agriculture yielded precisely the same results — about fifteen may possibly be immediate, though again all or almost all leave the door open to classification as eudæmonistic." "As regards the influence of authority the only conclusion I am able to draw from these data is the absence of any evidence for the existence in these two groups of persons of moral judgments created by the mere presence of a foreign will. In other words, practically all gave a reason for their judgments and this reason in most cases was one based on welfare, either of those immediately concerned or of a larger whole."

Before considering the bearing of this on the question as to the influence of custom we need to note what alternatives the author proposes. He wishes to investigate the theory "that the prevalence of a uniform mode of behavior in a given society, especially if none of its members can remember a divergent mode as existing within its borders, is capable of creating the judgment that the conduct in question is a duty." This influence of custom, if there be any such thing, may be conceived to operate in one of three ways: (1) The mere fact that a certain mode of conduct is observed to be general generates in the mind of the individual the notion that it is obligatory. (2) The fact that a mode of conduct is general is taken by the individual as evidence that the majority (or all) wish it to be universal. This felt pressure of the wills of the many upon his will generates in him the conviction that the action is obligatory. (3) The individual though having moral conceptions of his own may yet in cases of conflict accept general usage as indicating the moral convictions of the majority, and thus as a more trustworthy guide than his individual judgment. Disregarding (1) as not to be taken seriously, the author holds that neither (2) the 'foreign pressure' theory, nor even (3) is supported by his tests.

One must certainly agree that certain statements of the custom theory will not stand either theoretic criticism or the test of facts. But as one who has committed himself to the doctrine that custom has a strong influence upon conduct at least, I feel bound to file caveats and raise questions with a view to requiring a consideration as to just what is implied by the facts brought out.

1. It is the explicit moral judgment of a 'cool hour,' or at least of detachment, and not the implicit judgments of actual conduct which the method examines. Professor Sharp considers this point (pp. 116 ff.), but I am not convinced that he gives it due weight. For example, if I interpret correctly the percentages on page 126, over half the students tested would approve giving an overdose of morphine to a patient hopelessly ill of a painful disease. I think it would be a safe guess that a far smaller proportion would actually do the act.

2. If one is asked to give a *reason* for his judgment, is it at all likely that he would allege either general custom or the 'pressure of other wills'? The average young person is not so averse to giving reasons on compulsion as was Falstaff, and if he has ever used such criteria as individual or social welfare for any act—and who has not?—will he not naturally fall back on this when explicitly challenged?

3. The heart of the matter seems to be the way in which custom would operate if it were operative at all. Would it be expected that any one really influenced to a sense of moral obligation by a group should consider himself acted on by a *foreign* will (italics mine)? It is the essence of our present view of group life that the member is one of the group, and therefore sharing in all the suggestions, the valuations, and the actions implied in the customs. Thus, as the author suggests, the farmers' boys value property strongly. It is characteristic of their class. A labor unionist's child has a detestation of a 'scab.' He could very likely give a reason if asked why. Nevertheless his judgment was probably due more to group influence than to individual reasoning.

4. The casuistry questions selected are many of them admirably adapted to stimulate 'mediation' and would hardly bring out the cases in which custom would be found as the controlling force. I should be interested in such inquiries as this, addressed to college students: Have your views as to the proper observance of Sunday changed at all since childhood? What were the grounds of your old views, and what are those for your present view?

5. Is sufficient prominence given to the marked difference between

the more sophisticated college students and the agriculture students in the matter of rigoristic and latitudinarian answers? The agriculture students are far more rigoristic. Professor Sharp believes that the explanation for this is to be found not in the influence of custom or the authority of the Bible, but "partly in the difference in education and average culture in the two classes, partly in the particular circumstances of their lives." Is not the 'difference in education' another way of spelling increased attention to the values of life on the one hand and to rational methods of procedure on the other? But both of these aspects of education would tend to replace custom. And as to the 'particular circumstances' I should incline to think that the social groups to which those questioned had belonged were more important than the physical conditions.

In conclusion, then, we should all agree that our explicit moral judgments tend to be reasoned. The present writer, however, believes that a large stratum of conduct is customary, in the sense that our approval is largely dependent on the current attitudes of our group. Who shall say that modes of women's dress, of dancing, of business or professional conduct, are approved or disapproved on purely reasoned bases, or that in our notion of what is decent or indecent, proper or improper (and these shade imperceptibly into right and wrong for the judgment of common sense) we can detach ourselves wholly from the group or class and form 'individual' valuations or judgments?

J. H. T.

#### LOYALTY.

*The Philosophy of Loyalty.* JOSIAH ROYCE. New York, The Macmillan Co., 1908. Pp. xiii + 409. Price \$1.50.

*Sub specie fidelitatis!* To reduce the virtues to one has proved to many a fascinating task. Wisdom, pleasure, perfection, duty, love, benevolence, rationality, power, and other concepts have served in turn as such an ultimate. Each has a fair claim to stand for some valuable aspect of the moral life. But none has established itself as adequate to satisfy the complex demands of reflection and action, of reason and feeling, of order and progress, of individual development and social claim. The point of view from which Professor Royce paints his picture is one that enables him to bring out certain values strongly. And it scarcely needs to be said that the coloring, the light and shade, the detail that helps the central motive, are all handled with masterly skill. Professor Royce knows how to present his message to the wide public that is ready to welcome philosophy provided

it is not required to learn a new language at the same time. But as the picture claims not only to be *a* picture, but a picture from a point of view which is adequate for comprehending the whole duty of man it must be so considered.

Loyalty as a central principle has this in its favor at the outset: it derives from one of the fundamental elements in early morality. In its simpler forms loyalty to clan, or chief, to tribal brother or ancestral god, exhibits the capacity to pass beyond the bounds of a physical self and recognize a social bond and social claim. Loyalty to a cause, which is the type of loyalty that the author holds up as the fulfilling of the law, is a more impersonal phase of the same attitude. In thus de-personalizing the conception of loyalty the question is, What content do we substitute for the old? For, whereas there was but one chief or clan there are many 'causes.' To which shall I be loyal? Doubtless I cannot serve God and mammon; but are not mammon's servants as loyal as God's? The formula that is presented as a criterion for our choice here sounds at first as purely formal as, Do your duty. It is, 'Be loyal to loyalty.' This, however, is not ultimate. On the one hand it is traced back to a more specifically individual act; on the other, the conception of loyalty is given a new social content.

The individualistic answer to the question, which cause? is: "Decide as I, your conscience, the ideal expression of your whole personal nature, find best." "We are fallible but we can be decisive and faithful." It may go without challenge that decision is necessary for moral conduct, and that it is noble to be faithful to a well chosen cause. But on this subjective side of conduct is there no further word? Certainly we cannot demand of a principle that it shall make our choices, but should it not give instruction as to the method of making them? Professor Royce refers us to the self as unified by a purpose, the purpose of loyalty. "It is devoting the self to a cause that after all first makes it a rational and unified self," and conscience is the voice of such a self. But admitting the value of all this, is it not important to stress also the aspect of reflection, and especially of investigation by scientific methods, if man is to find his cause? For one I believe that the most hopeful sign of present day morality as we see it actually at work is this use of scientific method in place of the chaos, the subjectivism, or the fanaticism of the older morality. Faithfulness is one side, but actual moral progress demands that we do not lavish our service in pathetic devotion to the wrong cause.

We turn then to the social content that is given to the principle. Loyalty to loyalty means 'an unity with the unity of all human life'

(p. 126). "A cause means something that is conceived by its loyal servant as unifying the lives of various human beings into one life" (p. 252). Loyalty means unity. And there can be no question that unity is a true social note. None the less when we ask whether this is *the* note most needed, we must settle with an ambiguity.

A unity is at least theoretically conceivable along the lines of subordination worked out by Plato and cherished by many as the only possible type. But another more democratic conception is hovering in the horizon of some. It involves a remaking of human nature, it is true, but just this constitutes its lure. I do not mean to suggest that Professor Royce's conception of unity will not welcome this as a possible mode, but it can scarcely be said to demand it. And I doubt whether any formulation which does not make this a dominant note will strike the deepest chords of the European and American conscience of to-day. It is because of this prior demand that 'justice' is likely for some time to come to evoke a larger response than unity. We must have unity. Yes, but we will struggle for justice first. For no unity is permanent, and none is fully moral that does not include justice.

In his later chapters on 'Loyalty, Truth and Reality' and 'Loyalty and Religion' the author devotes himself to the correction of the pragmatists, and with a neat turn borrows a phrase in which to frame his final definition of loyalty: *Loyalty is the Will to Believe in something eternal, and to express that belief in the practical life of a human being.*

J. H. T.

#### PSYCHOLOGY OF ADVERTISING.

*The Psychology of Advertising.* WALTER DILL SCOTT. Boston, 1908. Pp. 269.

While every one has been vaguely aware that there is a great deal of 'psychology' involved in advertising, Professor Scott deserves the credit of being the first to work out clearly and definitely the application of psychological principles to this field of activity. This work treats specifically of memory, the feelings and emotions, sympathy, instinct, suggestion, the will, habit, and attention, showing with what principles in each of these processes the advertiser has to reckon, and in what way. His points are illustrated by familiar advertisements taken chiefly from the magazines. He also gives the results of investigations which throw light upon the amount of time that the average reader of a magazine devotes to looking over its advertisements, the

attention-value of small and large spaces, the employment of different kinds of type, and the arrangement of display type and cuts so as to prove most effective, and similar practical questions in which psychological principles are involved. He quotes freely from Professor James' works, and follows his general point of view in the theoretical psychology employed.

Perhaps the detail of chief interest to the social psychologist is the discussion of the manner in which the advertiser should appeal to instincts affecting the social self. Every one wishes to be regarded as belonging to a desirable social class, and one of the advertiser's problems is to make his goods appear to be in demand by this preferred set. A millinery cut representing hats worn by refined and well-dressed ladies, and the advertisement of a flesh-reducing remedy adorned by a cut of a refined lady, well gowned but obviously embarrassed by her excessive embonpoint, are effective in their appeal, while an awkward peasant lout holding a shoe in his hand, and a vulgar fat woman dressed in plaids are ineffective.

The discussion of food advertisements is interesting. People decidedly prefer turkey to pork, and quail to chicken, although they are actually unable when blindfolded to distinguish these foods by differences in taste. The preference is a matter of association. Turkey is rarer than pork, and suggests Thanksgiving and other pleasant scenes, while quail is associated with the pleasures of the chase, the open fields, pure air, and exhilarating sport, and is usually daintily garnished when brought upon the table. Consequently the man who has food stuffs to sell needs to create a glamor over them analogous to that which turkey and quail now enjoy. This, Professor Scott thinks, can be done by the right kind of advertising. The dainty, ethereal ladies appearing in the advertisements of Nabisco wafers are effective in associating this food with daintiness and elegance, while a promiscuous abundance of fruit appearing in a Wheatlet advertisement is repulsive. Similarly, several toilet articles are commended by the purity and daintiness suggested in advertisements, and a certain brand of pianos is effectively advertised by cuts in which the piano appears in parlors furnished in great elegance and good taste.

The book closes with the report of a questionnaire embodying the attitude toward the daily newspapers of two thousand leading Chicago business and professional men. These show a profound lack of confidence in the reliability of newspapers in regard to news, which Professor Scott thinks seriously affects their value as advertising mediums. In this connection he says: "The hope for relief from sensational

journalism is to be found only in the discovery of the fact that a very influential class of business men cannot be influenced by advertisements appearing in sensational publications."

As will have been observed, Professor Scott thinks that the most important process for the advertiser to employ is suggestion, and that appeals to the reason are only of supplementary value. To be sure, in this book he considers chiefly the general run of magazine advertisements, which can hope for only very cursory attention, and probably he would admit that the rational element enters more largely into circular letters, and into advertisements of investments and of expensive articles of consumption. The reviewer is convinced by Professor Scott's book that mere repeated suggestion by advertisements influences all of us in our purchases more than most of us are aware; but he would like to ask if there may not after all be a more or less reflective attitude implied even in our apparent openness to suggestion from magazine advertisements. We have found advertised articles satisfactory in the past. An advertised article is probably a good article; it costs money to advertise, and business men are not likely to go to a large outlay to advertise trashy articles which no one will buy a second time. Consequently it seems wise to buy an article with whose name one has become familiar through advertisements rather than an article of which one has no information except the dubious recommendation of the sales person who perhaps receives an extra commission upon sales of the less known articles.

The book throughout is extremely suggestive. It demonstrates that psychology has fully as close an application to the field of advertising as to that of education, and suggests the probability that psychology can be applied with equal profit to salesmanship, the display of merchandise, soliciting — in fact, to everything which has to do with placing goods upon the market and effecting their sale. If such proves to be the case, may we not expect that in the not far distant future applied psychology will be as prominent a feature in the commercial courses of our universities as it is in educational courses to-day?

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W. K. WRIGHT.

#### SOCIAL HEREDITY.

*Heredity and Selection in Sociology.* GEORGE CHATTERTON-HILL.  
London, Black; New York, The Macmillan Co., 1907. Pp. xxx + 571.

Of the three parts into which this book is divided, Part I., The Theory of Descent, deals with biological material and conceptions.

Part II., Social Pathology, considers especially suicide, insanity, alcoholism and syphilis. The rapid increase in the first three argues a relaxation of social restraints. In the case of suicide this (rather than suggestion or imitation) is indicated by the comparative frequency of suicide in Protestant as versus Catholic districts, and by the greater prevalence among the unmarried or widowed as compared with the married, especially as compared with those who have children. The 'inverse selection' due to militarism, to the later marriages of the educated classes, and to the smaller families of those in better economic circumstances, is also considered as a factor constantly at work against social welfare. Conflict and selection are regarded as necessary methods of progress; ethical influences are of slight importance in shaping the course of evolution. The general conclusion is that our present social polity is not favorable to progress. Part III., The Actual Conditions of Social Solution, examines 'The Bankruptcy of Liberalism' meaning by 'Liberalism' popular government carrying out two ideas 'the rights of the individual as an individual and the unrestricted competition between individuals.' These two are irreconcilable, and in fact modern capitalism pays no attention to the rights of the weaker. On the other hand, socialism although endeavoring to recognize the value of the individual life rejects conflict, which is a necessity for expansion of life. The author finds the only salvation for society in a supra rational sanction — religion. There is much stimulating discussion, but the author does not make it clear just how he proposes to get society to adopt a 'supra rational' sanction for the end of its own preservation. If nature is 'mechanical' and social evolution has no 'moral aim' religion seems to have little basis in reality. But on the other hand if a belief in it is necessary for social integration and those societies will be eliminated which do not possess it, we seem reduced to Voltaire's standpoint with a slight variation: There is no God, but it is necessary to invent one.

J. H. T.

#### SOCIAL PSYCHOLOGY.

*La philosophie sociale de Renouvier.* ROGER PICARD. Paris, Marcel Rivière, 1908. Pp. 344.

Sixty-one years of literary activity are not often given to one man, but Renouvier's first publication appeared in 1842 and his last in 1903. It is a service to give so lucid and condensed a statement of the social philosophy embodied in the two volumes of the *Science de la Morale* and the four of the *Philosophie Analytique de l'Histoire*. Neo-

criticism in social philosophy meant the assertion of the rôle of the free individual in history as over against the 'stages' of Comte or the mechanism of Buckle. But it meant also the emphasis upon justice as the fundamental moral category in opposition to that form of individualism which as held by the classical economists permitted exploitation of the weak by the strong under the guise of liberty, and with the professed purpose of securing the greatest happiness.

*Pessimisme, Féminisme, Moralisme.* CAMILLE BOS. Paris, Alcan, 1907. Pp. vi + 173.

Three types of pessimism — pagan, christian (Pascal), and atheistic (Léopardi) are sketched. The movement for 'equality' of women with men is criticized from the standpoint of science and morals. Under 'Moralism' Maeterlinck's *Wisdom and Destiny*, the notion of parenthood, and the mutations of love between the sexes in ancient and modern times. The book is sketchy and can scarcely claim scientific merit.

*Le troisième sexe. Les homosexuels de Berlin.* MAGNUS HIRSCHFELD. Paris, Rousset, 1908. Pp. 103.

This monograph, written apparently three years ago, is by a physician who in the practice of his profession had occasion to know many of the "uraniens" of Berlin, and has made a sympathetic sketch of their abnormal attachments. The author estimates that there may be 50,000 in that city, so constituted as to experience these more or less sentimental attachments for their own sex only. Certain clubs — literary, musical, etc. — are composed exclusively or largely of such members. Such gatherings are described, but there is little attempt at psychological analysis.

J. H. T.

*Vie religieuse et vie économique.* RENÉ MAUNIER. Revue internationale de sociologie, 1907, XV., 841-880; 1908, XVI., 16-36, 88-106.

M. Maunier believes that economic functions have developed in primitive life in very close conjunction with, and dependence upon religious beliefs and practises. This is evident in the rise of division of labor, to which, as an economic factor of central importance, he devotes his chief attention. He shows that division of labor does not owe its origin to rational choice and calculation upon the part of individuals — as the psychology of the classical school of economists

has led us to suppose — but upon the social will of tribes, determined by a social logic that is collective and emotional.

Division of labor first appears in primitive races with the assignment of distinct tasks to each sex. At first the men hunt and fish, while the women gather fruits, and often build the huts and till the soil in rudimentary fashion. Later, men build the huts and cultivate the soil, while the work of the women becomes more domestic in character. In all cases each sex is given very specific tasks to do, which are prohibited to the other sex under severe penalties. The ground for this sharp division of labor between the sexes is religious, resting upon taboos probably due to the sanctity attached to blood, especially menstrual blood. This flow of blood makes woman sacred, bringing her into peculiarly close relationship to the totems, and results in the assignment to her of carefully allotted tasks which thereby become taboo to the men.

So long as social intercourse is restricted to a single clan, sexual division of labor alone exists. But when society is enlarged by the fusion of clans, a new division of labor between the clans appears, based upon totemic conceptions, and the sexual division becomes less important, and largely disappears.

When clans have crystallized into castes the dependence of economic specialization upon religious beliefs is clearly marked. At the start we here have an original caste in which the functions of king, priest, and magician are often combined. These are later separated into distinct castes which are protected by taboos, and which perform numerous economic as well as religious functions. Still later the smith and merchant castes become separated from these, and are likewise protected by taboos. Professions are the exclusive monopolies of distinct castes, upon whose members they are obligatory; and the grounds of monopoly and obligation are originally religious, and only later economic.

*Du rôle des idées dans l'évolution des sociétés.* S. JANKELEVITCH.  
Revue philosophique, 1908, XXXIII., 256-280.

The meaning of history must be sought in the development of ideas; for while material factors are important in the determination of events, they are inadequate for the explanation of them. Primitive peoples, indeed, adapt themselves to their environment in almost reflex fashion; but with the commencement of civilization man begins to reflect, to criticize, and to form general ideas. In civilized life we therefore find a conflict and mutual adjustment between ideas and facts.

Comte's theory of the three stages is found inadequate for explaining the causes of social evolution; science is not the cause but the product of social evolution, and this latter can be traced with equal distinctness in the evolution of any other order of facts, *e. g.*, the position of woman, peacefulness, recognition of the worth of human personality. Nietzsche and others who have thought of social evolution as a mere recurrence have failed to abstract ideas from facts, and to discriminate between ideas which are only survivals, or merely consequences of the friction between new and old, and ideas which actually condition the present and determine the future.

There are 'organic ideas,' so to speak, immanent in human social evolution. Civilized societies are distinguishable not so much by the manner as by the degree in which they realize these principles. Among savages these ideas have not yet risen above the level of consciousness; among civilized peoples the *élan social* (imitating Bergson's *l'élan vital*) is active in varying degrees. It is never distributed equally among all classes in any given society. The vast majority in any society are like savages in their blind devotion to material facts, traditions, and habits, and in the inertia which they oppose to progressive ideas. Progress is only secured by the action of the *élite*, men of strong personality who succeed in overcoming the inertia of the masses, and so continue the course of social evolution and really make history.

*The Psychology of Mysticism.* E. BOUTROUX. Internat. Journal of Ethics, 1908, XVIII., 182-195.

M. Boutroux's address, of which this is an excellent translation, is perhaps the clearest brief statement of the points involved in the psychology of mysticism that has been made. Six phases of the mystic's procedure are distinguished. The mystic has put a special emphasis on *introspection*, through which he believes that he can penetrate beneath the ordinary facts of consciousness to the inmost depths of his own being, and on *experiment*, through which the mystic, given certain abstract ideas of love, beauty, goodness, God, makes them emotionally his own, and so nourishes the true life of the soul. Viewed from the standpoint of the objective psychologist, the phenomena of mysticism must be reduced to auto-suggestion and mono-ideism. But auto-suggestion and mono-ideism are not necessarily abnormal or pathological. The man of genius and every man of action manifests them. All depends upon the moral and social value of the idea upon which the mystic concentrates his whole attention. Mysticism does not seem necessarily to involve asceticism, but suggests possibilities of

large social value in working for the solidarity of humanity without sacrificing individual, family, and national values. It therefore deserves the serious study both of scientists and humanitarians.

*The Sources of the Mystical Revelation.* GEORGE A. COE. Hibbert Journal, 1908, VI., 359-372.

The main body of the article is an argument to show that no proof for the ontological validity of the mystic's experiences can be derived either (1) from the generic similarity in content of mystic experiences, as James has argued, or (2) from evidence for an affective adjustment to a larger reality not open to our cognitive processes, as Starbuck and Pratt maintain. On the other hand, Professor Coe concludes that 'the mystic acquires his religious convictions precisely as his nonmystical neighbor does, namely, through tradition and instruction, autosuggestion grown habitual, and reflective analysis.' The ideas of the mystic are traceable to social inheritance and are 'part and parcel of the general historical movement of religious life.' This, however, does not dispose of mysticism wholly. "For, though we trace the ideas of the mystic to some social tradition that he has imbibed, the tradition as a whole needs to be accounted for." And though 'we may even go so far as to say that all real religion consists ultimately in some mystical practice,' our present need is for 'a deeper analysis of the functions of the will in religion,' and this analysis will 'lead us toward a faith-philosophy and away from mysticism.'

W. K. WRIGHT.

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*L'Esprit de l'Allemagne moderne.* PAUL ELTZTASCHE. La Vie Contemporaine, 1908. April special number.

The great commercial and industrial advance in Germany has been accompanied by parallel interest in education, although artistic culture has suffered. In morals there has been departure from old time simplicity; but, on the other hand, activity, energy, occupation, have gained new value. Solidarity has increased, and there has been an extraordinary development of active altruism.

J. H. T.

*L'Ideal moderne.* PAUL GAULTIER. Paris, Hachette et Cie., 1908. Pp. viii + 358.

There is little of psychological interest in this book. It attempts a 'higher synthesis' of the current antinomies of liberty and economic

inequality, of individualism and socialism, of science and religion. In attempting to get to a level in which differences will be overcome, the author succeeds in eliminating most that is positive and characteristic in the opposing movements.

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## DISCUSSION.

### THE PSYCHOLOGY OF FEELING AND ATTENTION.

I think that the printing of the two following passages, side by side, will carry its own moral. The first passage occurs in Professor Meyer's paper on the nervous correlate of attention (*PSYCHOL. REVIEW*, XV., 1908, 359).

Meanwhile Titchener's *Psychology of Feeling and Attention* has been made public. If there is anyone whom the historical part of my previous article did not convince that the traditional methods of investigating feeling — no matter whether experimental or otherwise — have reached a *cul-de-sac*, Titchener's book will convince him. The author's conclusion is decidedly pessimistic, one might even say desperate. He confesses "to a feeling of unpleasantness, tension and depression. We know so very little of the subject of these Lectures, and the work that we have found to do will take so long in the doing!" This will hardly encourage any student to devote himself to an investigation of feeling. . . .

The conclusion of my book (pp. 316 f.) is this:

I finished writing the last paragraph with a feeling compounded, in Wundtian terms, of pleasantness, relaxation and tranquillisation. We set out from uncertainty and chaos ; and we have at least achieved a definite point of view, and have laid out a programme of experimental work for the future. Unfortunately, affective processes move between opposites : and that first feeling . . . soon gave way to a feeling of unpleasantness, tension and depression. We know so very little of the subject of these Lectures, and the work we have found to do will take so long in the doing! But feelings, again, are subject to *Abstumpfung*, show the phenomena of adaptation ; and the feeling of depression passed as the feeling of relief had passed before it. The professional attitude came to its rights. And that attitude, in the case of the experimental psychologist, is . . . an attitude of patient confidence. We must be patient, because of all the objects of human enquiry mind is the most baffling and the most complex. . . . But we may have absolute confidence in our method, because the method has proved itself in the past ; it has done far more for psychology than is generally acknowledged, far more even than is recognized in the ordinary text-book of psychology. . . . There is not the slightest doubt that the patient application of the experimental method will presently solve the problems of feeling and attention.

E. B. TITCHENER.

BOOKS RECEIVED FROM NOVEMBER 5 TO  
DECEMBER 5.

- Über Theodor Lipps' Versuch einer Theorie des Willens.* J. PIKLER. Leipzig, Barth, 1908. Pp. 50.
- Zwei Vorträge über dynamische Psychologie.* J. PIKLER. Leipzig, Barth, 1908. Pp. 24.
- A Handbook of Suggestive Therapeutics, Applied Hypnotism, Psychic Science.* H. S. MUNRO. St. Louis, Mosby, 1908. Pp. iv + 360.
- Heredity.* J. A. THOMSON. Science Series. New York and London, Putnams, 1908. Pp. xvi + 605.
- Encyclopedie of Religion and Ethics.* Ed. by JAMES HASTINGS. Vol. I. A — Art. New York, Scribners; Edinburgh, Black 1908. Pp. xxii + 903.
- Textbook of School and Class Management, Theory and Practice.* F. ARNOLD. New York, Macmillans, 1908. Pp. xxii + 409.
- Human Nature in Politics.* G. WALLAS. London, Constable, 1908. Pp. xvi + 302. 6/-.
- Report of the Commissioner of Education (1907).* Vol. I. Washington, Gov. Print. Office, 1908. Pp. vii + 522.
- Das Gedächtniss. Die Ergebnisse der experimentellen Psychologie und ihre Anwendung in Unterricht und Erziehung.* M. OFFNER. Berlin, Reuther u. Reichard, 1909 (for 1908). Pp. x + 239. M. 3.
- Bulletijn van het Algemeen Paedagogisch Gezelschap (1907).* Brugge, Witteryck, 1908. Pp. 118.
- Les Problèmes de la Science et la Logique.* F. ENRIQUES. Tr. from the Italian by J. DUBOIS. Paris, Alcan, 1909 (for 1908). Pp. 256. 3 fr. 50.
- Proceedings of the American Association for the Advancement of Science, Chicago Meeting, 1907-8.* The Secretary, 1908. Pp. 378.
- L'Adolescence; Etudes de Psychologie et de Pédagogie.* G. COMPAYRÉ. Paris, Alcan, 1909 (for 1908). Pp. 196. 2 fr. 50.
- The Miller and the Toad.* RICHARD CLIFTON. Boston, Sherman, French & Co., 1909. Pp. 220. \$1.20 net.
- Report of President Butler to the Trustees of Columbia University.* November 2, 1908. (Advance Sheets.) Pp. 56.

THE autumn meeting of the North Central Psychological Association was held in Chicago on November 28. About seventy-five persons attended the sessions, which were held in the new Psychological Laboratory of the University of Chicago. The following papers were read: 'The Moral Value of the Esthetic Experience,' E. L. NORTON (Illinois); 'Consciousness as Object of Cognition,' B. C. EWER (Northwestern); 'Some Results of an Investigation of Memory for Absolute Pitch,' J. W. BAIRD (Illinois); 'The Transference of Practice,' W. F. DEARBORN (Wisconsin); 'The Psycho-Galvanic Reflex,' D. W. STARCH (Wisconsin); 'A Supplementary Report on the Psychology of Learning a Language,' IRVING KING (Michigan); 'The Possibility of Binocular Vision in Certain Animals,' KARL T. WAUGH (Chicago); 'The Mystical as a Psychological Concept,' GEORGE A. COE (Northwestern); 'Note on the Evolution of the Religious Consciousness,' HENRY W. WRIGHT (Lake Forest); 'Primitive Animism,' EDWARD S. AMES (Chicago); 'Social Consciousness,' GEORGE H. MEAD (Chicago); 'The Psychological Machinery of the Concept of Infinity,' ROWLAND HAYNES (Minnesota).

MOST of the figures in Meyer's *Introduction to the Mechanics of the Inner Ear* have been reproduced in lantern slides (twenty-three) made from the original drawings. The figures have been conveniently grouped together, two or more on one slide, as much as possible. Five slides have also been made from the original drawings of the figures illustrating nervous architecture and function, in the PSYCHOLOGICAL REVIEW, XV. (4, 5). Any or all of these slides may be obtained (30 cts. each) by addressing Professor Max Meyer, University of Missouri.

PROFESSOR W. B. PILLSBURY, of the University of Michigan, is lecturing at Columbia University during the present term, in place of Professor Cattell, who is absent on leave.

THE present number of the BULLETIN, dealing especially with social psychology, has been prepared under the editorial care of Professor J. H. Tufts.

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